Bridging the language/culture divide: Fostering international understanding and collaboration to address issues of global concern

By

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Declaration of Originality

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The research associated with this thesis abides by the international and Australian codes on human and animal experimentation, the guidelines by the Australian Government's Office of the Gene Technology Regulator and the rulings of the Safety, Ethics and Institutional Biosafety Committees of the University.

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Abstract

It is clear that we live in an age when a lingua franca is essential to address many regional and global environmental and social problems. It is also evident that there is at present, and will continue to be for the foreseeable future, a heavy dependence on English as the principal international lingua franca. This qualitative research focused on the processes and problems involved in cross-linguistic communication concerning global environmental issues, and their potential impacts on international collaboration. The goal was to illuminate ways in which international environmental outreach programs can become more effective in promoting understanding of the environmental and cultural issues involved, as well as improve collaboration and cooperation in the generation of solutions to environmental problems.

The first research stage explored the experiences of individuals from 16 countries who were involved in international education, outreach and communication (EOC) about polar issues during the International Polar Year 2007-2008 (IPY). This was an in-depth investigation of how the IPY EOC programs functioned in relation to multilingual issues, with the aim of identifying potential commonalities and differences about what worked well in different cultural, linguistic and social contexts. Interview questions centred on interactions related to language and culture during group meetings, and the reasons for success (or lack of success) in international EOC programs that were conducted over a four-year period. Interviewees were also asked for their opinions on the positives and negatives of using English as a lingua franca to communicate on issues such as climate change, and for their suggestions about effective ways to communicate about these issues across cultural and linguistic boundaries. Analysis of the data obtained was used to refine additional research questions that were investigated in more depth in the next stage.

The second stage broadened the focus to consider how the initial findings might benefit other global environmental EOC initiatives. Teachers and adult facilitators who were identified during the IPY interviews developed a joint school project with classes in Brazil, Chile, Greenland and Malaysia. Using an action research approach, they identified issues that were relevant and interesting to them, and worked collaboratively to seek solutions. My research in this stage focused principally on the communication strategies used by both teachers and students as they tried to work with peers in the other countries. I also investigated the impacts of English-language domination of scientific research on science education and communication at both international and local levels.

The study concluded with a summary of some of the common issues identified, outlined some possible strategies for their resolution, and suggested areas for further research. This information may help others plan and deliver more effective international and intercultural programs in the future.

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List of Abbreviations

AELF – Academic English as lingua franca

APECS – Association of Polar Early Career Scientists

BELF – Business English as lingua franca

EFL – English as a foreign language

ELF – English as lingua franca

EOC – Education, outreach and communication

ESL – English as a second language

ICSU – International Council for Science

IPO – International Programme Office (for the International Polar Year)

IPY – International Polar Year

JC – Joint Committee (for the International Polar Year)

NES – Native English speaker

NGO – Non-governmental organisation

NNES – Non-native English speaker

PEI – Polar Educators International

SoP – Sharing our Planet (education project)

TEFL – Teaching of English as a foreign language

TESL – Teaching of English as a second language

TESOL – Teaching of English to speakers of other languages

UNAM – Universidad Nacional Autónima de México

WMO – World Meteorological Organization

Chapter 1: Introduction

Years ago, when I was hiking in the Italian Dolomites, I was stopped by a young couple who were obviously lost. Neither of them spoke any English. They asked me if I spoke Italian. I said "no" and asked if they spoke Spanish. They replied in the negative and asked me if I spoke French. I said that I could only speak a little French and asked if they spoke German. Their reply was "only a little bit." All of these questions and answers were in the languages being discussed.

There followed a very interesting conversation that I have never forgotten. Speaking in Italian, they told me that they were looking for a small lake that was supposed to be nearby. I understood the question and answered in Spanish as we looked at the trail map and discussed it. Whenever we had trouble expressing our ideas in one language, or didn't understand what was being said, we would switch languages and try again. I would say something in German and they would respond in French, or they might ask a question in French and I would answer in Spanish. After about 10 minutes of discussion and laughter, we had located the lake and figured out how to get there. We had succeeded in communicating despite our linguistic differences.

What we had communicated, however, were basic facts – how to get from point A to point B using a trail map and a compass. We were also helped greatly by the fact that we all spoke more than one language, albeit with varying degrees of facility.

Communicating complex ideas or negotiating about issues that may be political, ideological or controversial in nature is much more problematic. This is true even among monolingual populations who share similar cultural backgrounds and values, and it becomes even more complex when it involves people from diverse cultures and linguistic backgrounds.

Despite its complexity, an ability to communicate across cultural and linguistic boundaries is becoming an essential attribute for life in a globalised world. As Suárez-Orozco and Sattin (2007) contended, "Children and youth growing up today are more likely than in any previous generation to face a life of working and networking, loving and living with others from different national, linguistic, religious, and racial backgrounds" (p. 37). They also noted that young people will need special skills to meet this challenge, including the ability to "learn with and from them, to work collaboratively and communicate effectively in groups made up of diverse individuals" (p. 38).

Reinforcing this idea, Boix Mansilla and Gardner (2007) emphasised the importance of developing a "global consciousness" to live successfully in this new reality. They defined global consciousness as "the capacity and the inclination to place our self and the people, objects, and situations with which we come into contact within the broader matrix of our contemporary world" (p. 78). They explained:

> An individual exhibits global consciousness when she is attuned to daily encounters with world cultures, landscapes, and products (e.g., through the Internet and other media and through migration); places such encounters in a broader narrative or explanatory framework of contemporary global processes (e.g., the traffic of people, capital, and ideas; shifting economies, demographic, and cultural interdependence); and perceives herself as an actor in such a global context (e.g., acting locally on global issues, using channels of transnational participation, resisting geopolitical change). (p. 78)

This consciousness, especially the perspective of being an active participant in global issues, is more important than ever before in an age of increasing globalisation, rapidly expanding population, and escalating stresses on our environmental and social resources. Problems such as climate change, loss of biodiversity, poverty and food

security are global in scope and need to be addressed at international levels. To do this successfully requires an understanding and appreciation of other cultures, development of common goals, and close international collaboration.

Language is a major tool for communication and understanding between human beings. Linguistic diversity also plays a critical role in maintaining a healthy cultural diversity that can help build inclusive knowledge societies through the sharing of unique localised information and understanding, as well as activate the political will necessary to apply the benefits of a rapidly growing body of scientific and technological knowledge towards sustainable development (UNESCO, 2003). However, this cultural and linguistic diversity can also be a challenge to the development of mutual understanding.

English is currently the main international language of science, business, and tourism (Joseph, 2004) and is commonly used for international communication about global issues. However, numerous social science researchers (e.g., Bourdieu & Thompson, 1991; Durand, 2006; Fairclough, 2001; Phillipson, 2011), have expressed concerns about the effects of this on cultural diversity, as well as on the balance of power between people in both English and non-English speaking countries. Bourdieu wrote extensively about the way in which individuals' language abilities help create and maintain social class distinctions. Language ability (which includes factors such as accent, vocabulary, grammar, and spelling) can be seen as a type of "cultural capital" that, along with economic capital, plays a major role in determining a person's social status and impacts on their ability to improve their status in the social hierarchy (Bourdieu & Thompson, 1991). In his words:

> The competence adequate to produce sentences that are likely to be understood may be quite inadequate to produce sentences that are likely to be *listened to*, likely to be recognized as *acceptable* in all the situations in which there is

> occasion to speak … Speakers lacking the legitimate competence are *de facto* excluded from the social domains in which this competence is required, or are condemned to silence. (p. 55, italics in original).

Fluency in English may therefore confer a disproportionate benefit on a select minority who have the capacity to adapt their language and their communication style to particular contexts and situations (Tange & Lauring, 2009). This may limit international dialogue and affect both people's understanding and perceptions of scientific and environmental issues, and their willingness to act. It also has the potential to limit the ability of non-native English speakers to share their expertise on an equal footing in the international arena, thus restricting the dispersal of knowledge both within the scientific community and to the general public.

The Research

My research focused on the role of the English language in fostering international collaboration on global environmental issues. The ultimate goal was to illuminate ways in which international environmental outreach programs could become more effective in promoting understanding of both environmental issues and the importance of local cultures and languages, as well as in encouraging collaboration and cooperation in the generation of solutions to the issues.

In keeping with the tenets of constructivist grounded theory (Charmaz, 2002), discussed in detail in Chapter 3, I began with a broad question: How does the use of the English language to communicate internationally about global environmental issues affect the perceptions of people in non-English speaking countries towards these issues, and their ability or their desire to participate in discussions and generation of solutions? This question was later refined and expanded upon as the research progressed and new

insights became available through a combination of a literature review and my initial interviews. My specific research questions evolved gradually over the course of the research and are described in more detail in the relevant chapters.

I began by examining how different people and groups dealt with language when trying to communicate internationally during the International Polar Year 2007-2008 (IPY), and how the languages and technologies used may have affected their discussions and the projects and initiatives in which they ultimately became involved.

Although I started the research with a focus on English, it soon became evident that the same issues are not only found when English is being used as a lingua franca, but in other contexts as well. They result from a combination of whatever language or languages are being used for communication, as well as cultural, political and technological factors. For example, research in environmental psychology has indicated that people's decisions on how to act or respond to a problem are not necessarily based on the quality of scientific evidence. Emotions, cultural norms, the ability to interpret evidence, perceptions of risk and belief in one's personal ability to make a difference all play a role in motivating action (Newell & Pitman, 2010). All of these factors can be influenced by language, especially in multilingual contexts. These issues are not only encountered at global levels. Similar problems may occur at other geographic scales, such as during intranational communications in multicultural or multilingual societies, or regional communications in places like Southeast Asia, the European Union, or South America.

It is noteworthy that many of the people involved in my interviews and case studies no longer live in their country of origin. In the list of respondents (Appendix 1), I have listed them under the country in which they were born and raised, and under their native tongue, even if they are now citizens of another country. I believe that the fact that

so many live elsewhere or have partners from another country or linguistic background highlights the salience of this research. As Suárez-Orozco and Sattin (2007) reminded us, this is becoming more and more prevalent as the world becomes more interdependent: "Globalization is about the increasing integration and coordination of markets, of production, and of consumption. These global economic forces are stimulating the migrations of people in unprecedented numbers from and to every corner of earth" (p. 27).

Researcher Ideology

All researchers approach their work with some kind of ideology, even though we are often unaware of what it is and how it affects our research, both in terms of the subjects we choose to investigate and the way in which we interpret what we see or experience. I think it is important to acknowledge this upfront and explain what beliefs underlie this particular study.

It wasn't until I was quite deeply involved in the research that I realised that I had, unwittingly, stumbled into a morass of strongly-held, often contradictory beliefs or ontologies, and sometimes vitriolic arguments about languages, the meaning of language and what is beyond the words themselves. Language is not just words that can be translated or interpreted and understood by others. It is a compilation of our culture, our history, our feelings of unity as a people, and as human beings. It is a large part of who we are and how we perceive ourselves and others (UNESCO, 2009).

It can't be denied that expansionist policies through military power and subsequent colonialism have a long and ugly history in most parts of the world, and exploitation of native populations has led to many inequities and injustices. Unfortunately, also, many indigenous languages have been lost as a result, and every day

more are being driven out of existence (Lewis, Simons, & Fennig, 2013; UNESCO, 2009). It is easy to blame the dominant cultures and languages for this actuality.

On the other hand, to deal with today's realities and global environmental issues such as climate change, I believe we *need* to communicate with each other over broad geographic areas, and we generally *want* to understand each other. This necessitates setting aside some of our natural or historical animosities and trying to find common ground, focusing on our similarities rather than our differences. What common goals can we work towards for the benefit of all?

Working toward common goals requires a degree of pragmatism, rather than just railing at what is wrong. That is what I am trying to do in this research: find the best way through the confusions and contradictions to arrive at some mutual understanding and ideas to move forward, especially for educating about and acting on global environmental issues.

English is currently the dominant language used in international communications about science and the environment. Recent reviews of international science journals show that more than 90% of articles in natural sciences and over 75% of articles in social sciences and humanities are written and published in English (Hamel, 2010). Estimates of the number of people in the world who speak a competent level of English vary dramatically, but are often cited as being around one-quarter of the world's population (Crystal, 2007). English may not always hold the pre-eminent position that it does today, but many researchers agree that it will probably remain so for the foreseeable future (e.g., Ammon, 2010; Crystal, 2007; De Swaan, 2010; Ricento, 2010).

This is what we have to work with at present. While there is an implicit expectation among Anglophones that the rest of the world will (or should) learn English, there is currently little incentive or desire among people from English-speaking countries

to learn other languages (De Swaan, 2010). This leads to an even greater disparity because it gives native English speakers a disproportionate advantage in international exchanges. Therefore, I believe that a key concern in resolving environmental problems is how to avoid the exclusion of those who don't speak English (three-quarters of the world) or who are reluctant to use the English they know to share their knowledge with people in other countries. How can we change the way we do things so that we can all participate on as even a level as possible?

I have deliberately chosen to write this dissertation in the first person, rather than hide behind the omniscient third person – for example, "The research indicated that …" My research is about people and how they interact and communicate. I am an integral part of that puzzle and helped create the version of "reality" that I have documented here. This use of first person is a commonly accepted practice in ethnographic or autoethnographic studies, as I have discussed in more detail in Chapter 3.

I believe that it is important to keep striving toward further understanding about the world around us, imperfect as those understandings may be. I also believe that the knowledge generated through our efforts and advances should have some practical value. Therefore, I discuss my research below and show how I have situated it within a qualitative research theoretical framework and methodologies that I hope contribute to that end.

Genesis of the Research

From 2006 to 2010, I served as the co-chair of an international committee dedicated to promoting education, outreach and communication (EOC) about the International Polar Year 2007-2008 (IPY). IPY was a globally-coordinated research program sponsored by the World Meteorological Organization (WMO) and the

International Council for Science (ICSU) that was centred on the polar regions and their role in controlling global climate. It included more than 200 interdisciplinary research, observation and education programs covering a wide range of physical, biological and social topics (Allison & Krupnick, 2011).

By the end of the official IPY scientific research period, which extended from March 2007 to March 2009, there was an actively engaged EOC community of approximately 750 teachers, media officers, journalists, early career scientists, and IPY national contacts from more than 30 countries. Many of these people served as focal points for further expansion of programs and projects across their own local and national networks (Zicus et al., 2011).

Later reflections about my IPY experience helped me recognise that we tend to take many things for granted, as unarticulated "truths." Because most of our committee members spoke fluent English, we never considered language issues during our meetings and teleconferences, talking easily in rapid, often vernacular, English. Our only discussion of language revolved around which of the materials and activities we produced should be translated into other languages.

Only in retrospect did it occur to me that this may have significantly affected the substance and directions of our discussions, as well as the projects we ultimately chose to undertake and the countries and people who participated in those projects. This sparked my interest in exploring the following broad research questions:

1. How did our dependence on English affect the working of the IPY EOC community and what can we learn from it?
2. What is the appropriate role of the English language in addressing issues of global concern and how can this best be accomplished?

These questions were later refined as I developed my research plan and are discussed in detail in Chapters 4 and 5. The evolution of the research questions is shown in Figure 1. Appendix 3 contains the study background information that was given to the initial respondents beforehand and a list of the starting questions that framed the interviews.

Research Stages

I conducted the research in two stages, and each stage required a different mix of the methods and approaches described in Chapter 3. In both stages, I used an iterative process, continually reassessing my research questions and my methodologies to incorporate new understandings as I developed them. The second stage of the research thus evolved as a way to explore emerging themes and constructs that I noticed in the first stage.

The International Polar Year (IPY) experience. The first stage of my research was a single-case study focused on the experiences of individuals from a broad range of countries who were involved in international EOC initiatives about polar issues during the recent IPY. This was an in-depth investigation of how the IPY international EOC programmes functioned in relation to multilingual issues, with the aim of identifying potential commonalities and differences about what worked well in different cultural, linguistic and social contexts.

IPY research questions. In keeping with Glaser's (1992) recommendations that researchers should approach their study without determining very specific and precise research questions beforehand, I started the research with four very broad questions:

1. In the perspectives of members of the international EOC community, did the use of English affect their participation in meetings and events and, if so, in what ways?

2. How did this impact our decisions about what international activities to undertake?
3. How did it influence people's decisions about whether or not to participate in the activities?
4. What lessons can we learn from the experience to improve this type of international collaboration in the future?

Themes that were identified from the first informants were incorporated into the subsequent interviews and observations, leading to a systematised data-generation as suggested by Fontana and Frey (1994). This led to a refinement of the initial research questions that were investigated in the next stage.

Sharing our Planet (SoP): Case studies of cross-linguistic collaboration. The purpose of the second stage was to broaden the focus from a single program and topic (IPY polar research), and consider if and how the findings of the first stage might benefit other global environmental education and outreach programs or projects.

SoP was developed with teachers and adult facilitators who were identified during the first stage of the research, as they had all been actively involved in polar education or outreach during IPY. We used an action research approach in its development, where the participants identified problems or issues that were relevant and interesting to them, and worked collaboratively to seek solutions.

SoP research questions. My research in this stage focused principally on the communication strategies used by the participating teachers and students as they tried to work with the other countries. Each of the groups involved can be considered a separate case study, while the interaction among them provided a single umbrella case study. There were two main research questions during this stage:

1. Which of the strategies identified by IPY participants were most effective in promoting better international communication and collaboration among children?
2. What are the impacts of English-language domination of scientific research on science education and communication at both international and local levels?

The second question was an unanticipated one that had emerged from the IPY interviews, so I used a theoretical sampling approach to identify additional respondents to provide further insight into this topic. The time spent in the countries where the case studies were undertaken enabled me to investigate both of the questions in more detail with a broad range of scientific researchers, science communicators, educators and youth leaders.

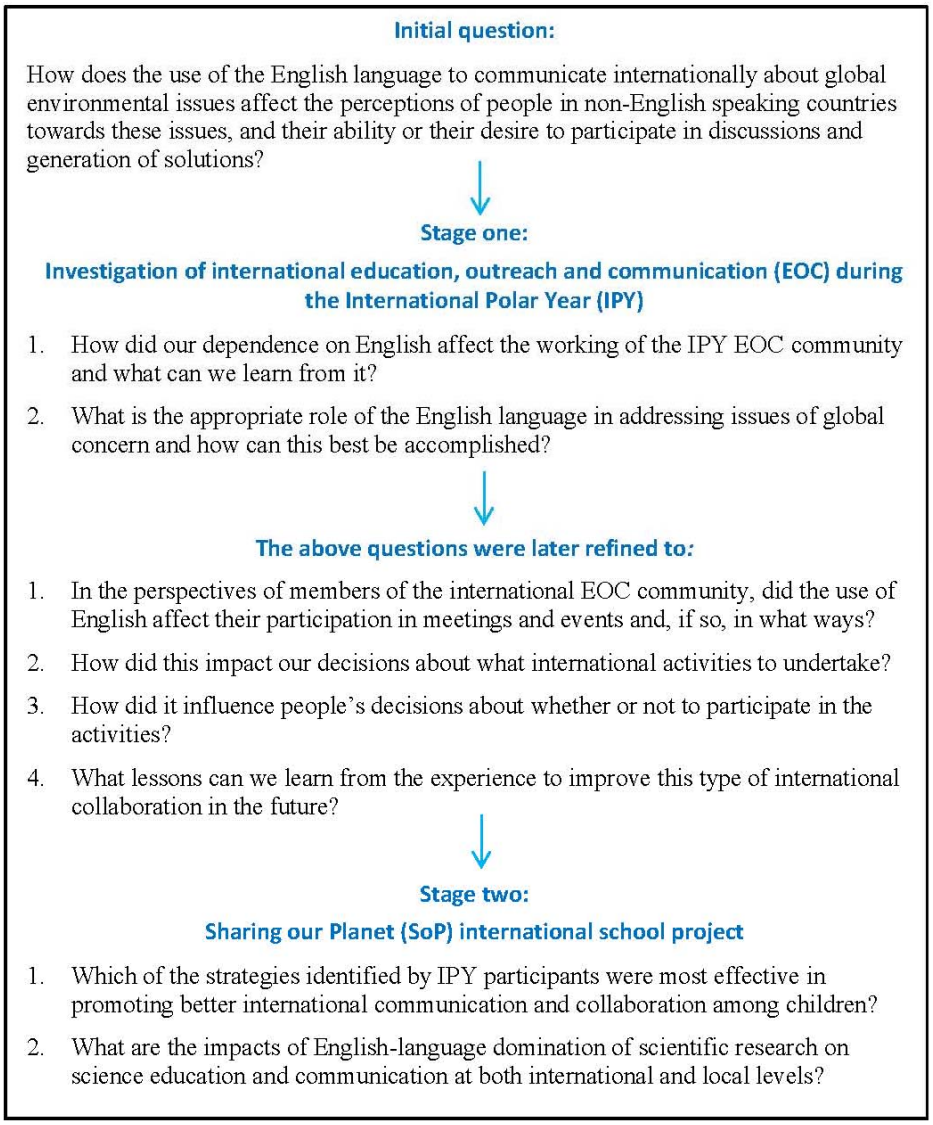

Figure 1. Evolution of the research questions

A Note about Climate Change

The Intergovernmental Panel on Climate Change (IPCC, 2013) recently published the first part of their fifth assessment report summarising the latest scientific evidence for global climate change. In this report, they emphasised the serious nature of the problem, stating:

> Warming of the climate system is unequivocal, and since the 1950s, many of the observed changes are unprecedented over decades to millennia. The atmosphere

> and ocean have warmed, the amounts of snow and ice have diminished, sea level has risen, and the concentrations of greenhouse gases have increased (p. 2).

IPCC also stated that it is "extremely likely" (meaning a probability of 95% or more) that human activities have been the major cause of the observed atmospheric and oceanic warming that has taken place since the middle of the 20th century. It is also extremely likely that more than half of the observed warming was due to increased levels of carbon dioxide (CO_2) and other greenhouse gases (such as methane and nitrous oxide), mostly from the burning of fossil fuels and changes in land use such as large-scale deforestation.

An analysis of polar ice cores shows that atmospheric concentrations of these greenhouse gases are now substantially higher than at any other time during the past 800,000 years. Warming will continue for centuries because of the CO_2 that is already in the atmosphere, even if all emissions were to stop immediately (IPCC, 2013).

The consequences of these changes are still unknown and are the subject of much research. Some predictions from the IPCC report:

- More intense and more frequent extreme precipitation events over most of the mid-latitude land masses and over wet tropical regions by the end of the century are "very likely" (90% or greater probability).
- Warming of the ocean will continue, reaching the deep ocean and very likely affecting global ocean circulation.
- It is very likely that Arctic sea ice cover, Northern Hemisphere winter snow cover, and global glacier volume will continue to decrease.
- Sea level will continue to rise due to increased ocean warming and melting of glaciers and ice sheets. The rise will be very likely to exceed the amount that was observed from 1971 to 2010.

- Continued uptake of carbon by the ocean will increase ocean acidification.

Climate change is not the only global environmental issue we face that requires international collaboration but, in my opinion, it is one of the most pressing because its effects may be most strongly felt by those people who have the fewest resources to adapt to it. The United Nations Task Team on Social Dimensions of Climate Change (2013) echoed this opinion in a recent draft discussion paper:

> The impacts of climate change will increasingly affect the daily lives of people everywhere in terms of employment and livelihoods, health, housing, water, food security and nutrition, and the realization of gender equality and other human rights. Impacts are expected to hit those living in poverty the hardest, partly due to their more prevalent dependency on the very natural resources affected by climate change and also because they have less capacity to protect themselves, adapt or recuperate losses. (p. 5).

I chose to focus on climate change in my interviews and discussions in this research for three reasons. First, it was the overarching theme that tied together almost all aspects of IPY research. Secondly, it was the link that helped make polar science and polar research relevant to people in tropical and other non-polar countries such as Malaysia and Brazil. Finally, as shown above, continued warming will affect almost all aspects of our lives, either directly or indirectly, and many of the people who will be impacted most severely are those living in countries that are the least responsible for it.

Organisation of the Dissertation

I have organised this dissertation in the following way:

In Chapter 2, I review relevant literature that informed the theoretical framework that guided my research and analysis.

Chapter 3 reviews the methodological approaches used in data collection and analysis.

Chapters 4 and 5 include detailed background information about each stage of the research, information about my specific roles as researcher/participant-observer in each phase, sources of evidence, methods of data collection and analysis, and discussion about insights gained from the data analysis.

Chapter 6 identifies and reviews some of the common issues related to improving international communication and collaboration that were noted by people I spoke with in both stages of the research, and offers some suggestions for their resolution.

Chapter 7 summarises the findings, considers the broader theoretical implications of the research, and makes suggestions for further research.

Chapter 2: Literature Review

Increasing global interdependence has led to a virtual explosion of research literature in a wide variety of disciplines about our growing reliance on English as the main language in international communication. The research ranges from the purely practical to the mostly academic and theoretical. For example, multinational corporations are seeking to improve their performance, and thereby their profits, by improving communications among their multilingual and multicultural staff (e.g., Beamer & Varner, 2001; Pullin, 2010; Tange, 2009; Tange & Lauring, 2009; D. Welch, Welch, & Piekkari, 2005). Health professionals are concerned about providing quality care and treatment to patients from increasingly culturally-diverse communities (e.g., Kapborg & Bertero, 2002; Murphy & Dingwall, 2003; Sue & Sue, 2003). Economists are investigating the monetary costs and benefits of multiculturalism and multilingualism (e.g., Ginsburgh & Prieto, 2010; Ginsburgh & Weber, 2011; Melitz, 2007). Political and social scientists are concerned with issues of hegemony and power that are engendered or perpetuated through language policies and language use (e.g., Canagarajah, 2002; Durand, 2006; Fairclough, 2001; Phillipson, 2011; Phillipson & Skutnabb-Kangas, 2013; Skutnabb-Kangas & Phillipson, 2010). On the other hand, many linguists and sociolinguists are interested in how the English language itself is changing – both in form and in function – as it is increasingly used in international settings, especially among groups of non-native speakers of English (e.g., Fishman, 2013; Kachru, 1986; Meierkord, 2012; Seidlhofer, 2005, 2009; Silva, 2000).

Acronyms abound in the literature and are sometimes contradictory or controversial, depending on the discipline and the particular worldviews of the researchers. ELF (English as lingua franca), BELF (business English as lingua franca), AELF (academic English as lingua franca), ENL (English as a native language), WE

(World Englishes), IAE (interaction among Englishes), EIL (English as an international language), EUL (English as a universal language) and Globish (Global English) are some of the more common. Adding to the confusion are various expressions used to refer to speakers – for example, NS and NNS (native and non-native speakers), L1 and L2 (referring to whether it is a first or second language for the speaker), as well as terms referring to the teaching of English, such as TEFL (teaching English as a foreign language), TESL (teaching English as a second language) and TESOL (teaching English to speakers of other languages).

A lot of theory about how language is used and how English is evolving is being provided by ELF, BELF and health research. This provided insight to my research questions in many ways, but it is mostly focused on the practical aspects of communication. For ELF much of the research is centred on either the theoretical evolution of the English language as it is used by non-native speakers or the practicalities of teaching English to speakers of other languages. For business (BELF) it is the "bottom line," a desire to make a profit. Health studies are focused on how to make sure that you are treating the right problem for the patient, and that the patient understands what he or she needs to do.

Environmental issues are highly charged emotionally, requiring other considerations than just the practical. It is especially important to consider culture when framing communication about environmental issues, or any other issue that is highly emotional in nature. This requires an understanding of the role of culture and an acceptance of cultural differences. As Gärdenfors (2007) said, "A culture is not just people in an environment, but a particular way of interpreting the world. Each culture brings with it a different set of patterns of interpretation" (p. 102). The ability to

recognise and respect other people's patterns of interpretation and resultant world views is an essential step toward developing effective international communication.

By comparing and contrasting emerging concepts and theories from these varied research fields, I gained valuable insight that helped frame the research questions and the methodologies used in this study. In this section, I review some of the key literature that helped inform my study.

Is the World Getting Smaller?

- *Number of countries in the world: 195 to 209, depending on how you define a country* (Political Geography Now, 2014)
- *Number of countries with McDonald's restaurants: 118* (McDonald's, 2014)
- *Number of countries where Coca Cola is sold: More than 200* (Coca Cola, 2014)
- *Number of countries where the movie Harry Potter & the Philosopher's Stone has been released: 95* (IMBd, 2014)
- *Number of international airline passengers in 2011: 2.8 billion* (IATA, 2012)
- *Percentage of the world population using the internet as of 30 June 2012: 34.3%* (Internet World Stats, 2014b)
- *Percentage of the world population registered on Facebook as of 31 March 2012: 12.1%* (Internet World Stats, 2014a)

Although the above statistics may not be completely accurate, they nevertheless show an increasingly prevalent pattern: the world is becoming more and more connected through agencies such as multinational corporations, movies and other forms of mass entertainment, airline travel, internet technology and social media.

The term "globalisation" came into the mainstream consciousness in 1985 after it was used by economist Theodore Levitt to describe "changes in global economics affecting production, consumption, and investment" (as cited in Spring, 2008, p. 2). Globalisation and its potential impacts have been the subject of much heated debate since

then. What is often problematic in these debates, however, is exactly what the term means.

Mufwene (2010) argued that the way a person defines the term "global" – as either meaning "world-wide" or "all-inclusive" – can give the concept of globalisation very different meanings. In the sense of "all-inclusive," globalisation can be viewed at varied scales ranging from local to worldwide. The key factor at all scales is interdependence among the various economic or industrial components that make the system function, whether it is a single corporation, a nation, or an international treaty. In Mufwene's perspective, globalisation could even be said to have begun with the advent of agriculture, and the separation of labour and interdependence in methods of food production that resulted. All of these might be considered types of globalisation because they have "differences of scale and complexity rather than ... differences in kind or spirit" (p. 32).

He went on to contend that, even if globalisation is viewed as a worldwide economic system, not all countries are equally engaged, pointing out that much of Africa and many Pacific Island states are only marginally involved, especially when considering telecommunications, banking, shipping and transportation (Mufwene, 2010).

As many critics of globalisation have also pointed out, the process inherently favours those who have economic, military, or political power, and disenfranchises much of the world's population. Phillipson (2001), for example, one of the most vocal critics of the increasing use of English as an international language (as what he calls "linguistic imperialism"), claimed that the business of corporations is to produce consumers rather than responsible citizens and that most advertising and media is dominated by these corporations.

Globalisation can be viewed from economic, political, or cultural perspectives or domains (Garrett, 2010). The economic debates centre on international organisations such as the World Trade Organization and so-called “free trade” agreements like the North American Free Trade Agreement and their impact on commodities exchange, job security, employment and the concentration of economic power.

Issues of globalisation are also important from a political perspective because of the increasing number of international or multinational organisations, both governmental and non-governmental, that require decision-making at an international level (Garrett, 2010). This is also true of international treaties such as the Law of the Sea, or global environmental issues such as climate change, where true international cooperation and action are needed to address the problems with any hope of success.

The cultural domain, which I discuss more fully in the following section, involves debates over inequality and individual power imbalances, as well as fears about homogenisation or standardisation of things such as worldviews, consumer goods, entertainment, education, and languages.

Eriksen (2007, p. 8f) discussed globalisation in a more holistic way by describing seven key characteristics that link the economic, political and cultural aspects (Figure 2). He saw the process not only as a geographical dispersal of people, products and ideas leading to increased standardisation, but also as the creation of new diversity through increased interconnectedness and mixing of different cultures.

Figure 2. Key aspects of globalisation (Based on Eriksen 2007, cited in Garrett 2010

UNESCO's *World report: Investing in cultural diversity* (2009) echoed Erikson's view that globalisation is not just leading to standardisation and homogenisation, but is also creating new diversity as increasing international migration brings diverse people and ideas together. They pointed out that globalisation, far from being a unilateral transfer, is actually a "multidimensional and multidirectional process involving accelerated and increased flows of virtually everything – capital, commodities, information, ideas, beliefs, people" (p. 6).

Globalisation and cultural diversity. Understanding the cultural elements of globalisation is crucial when it comes to international communication and collaboration. Once again, as with the word "globalisation," there are varied and sometimes conflicting definitions of the word "culture."

UNESCO (2009) uses a broad definition that was expressed in the 1982 *Mexico City declaration on cultural policies*. This declaration defined culture as the "whole complex of distinctive spiritual, material, intellectual and emotional features that characterize a society or social group including not only the arts and letters, but also modes of life, the fundamental rights of the human being, value systems, traditions and beliefs" (p. 3).

Peter Gärdenfors (2007) looked at culture from the perspective of neuroscience. In discussing the development of the brain and its dependence on recognition of patterns to make sense of the world, he pointed out that "one problem of globalization is the difficulty in perceiving the patterns of other cultures. Since these patterns do not fit those of our own culture, we often experience them as 'strange,' 'odd,' or simply foreign" (pp. 67-68).

For most of the 20th century, culture was usually seen as a fixed entity belonging to a nation or other political grouping of people that was transmitted intact from one generation to the next by means of social practices such as education or religious ceremonies. Now, there is a greater recognition that cultures are creative and receptive to new influences, and continually evolve through time along pathways that are specific to each culture (UNESCO, 2009).

In a recent report, *A new cultural policy agenda for development and mutual understanding*, UNESCO (2011) also reminded us that different cultures hold valuable local environmental knowledge and that this culture-specific knowledge could be a powerful tool in future management and protection of the world's natural resources. Language is a large part of cultural identity and the preservation of linguistic diversity is also critical for environmental sustainability. A great deal of the reservoir of environmental knowledge is tied up in language, especially the endangered languages of

indigenous people, and much of the world's biodiversity is found in the regions inhabited by these people (Skutnabb-Kangas & Phillipson, 2010).

UNESCO's 2011 report also acknowledged that social and cultural identities are becoming more dispersed and are no longer necessarily bound together by physical space, in large part because of digital technology. Many people identify with more than one cultural group. These different "cultures" may be real or virtual, and may be based on any number of factors such as ethnicity, nationality, religion, gender, occupation, or interests.

Thus, globalisation is not a straightforward process of homogenisation, but rather has a two-pronged effect, that is "the standardization of some cultural patterns at the global level and cultural diversification at the local level" (UNESCO, 2011, p. 9). Cultural diversity is essential for continued creativity and innovation in both the invention of environmentally-friendly products and technologies and in finding new ways to address environmental or other problems (UNESCO, 2011).

Globalisation and English language teaching programs. Languages are considered by some researchers to be global commodities, where each one has a "communication value" relative to other languages (De Swaan, 2010; Ginsburgh & Weber, 2011). The value can be determined on the basis of the utility of the language; in other words, on a speaker's ability to use the language to communicate with other speakers. In this sense, native English speakers benefit materially from the efforts of others who learn English because this, in effect, adds value to the English language. If more people speak a given language, others will want to learn it and more resources will be developed and distributed in that language, thus reinforcing its status (De Swaan, 2010).

This perspective, of course, is a pragmatic one that ignores issues of personal identification, power relations, and equity. Some researchers (e.g., Pennycook, 1994;

Phillipson, 2001; Skutnabb-Kangas & Phillipson, 2010) have argued that the teaching of English as a "second" or "foreign" language is a political strategy carried out by countries such as the United States and the United Kingdom to help spread their culture and political ideology. Phillipson (2011) contended that the continued push for English language education is unfair and helps maintain the gulf between people:

> English serves to consolidate the interests of the powerful globally and locally and to maintain an exploitative world order that disenfranchises speakers of other languages. A world polarized between a minority of English-using haves (whether as a first or second language) and a majority of have-nots is not likely to provide healthy conditions for people who speak languages other than English to flourish. (p. 454)

There can be little doubt that governments in English-speaking countries have a vested interest in the teaching of English as a second or foreign language that promotes their own ethnocentric worldviews. On their website, the British Council noted that they work with millions of people in more than 100 countries, with the goal of educating others about British culture, ways of living, and societal organisation. Their specified aims include making high quality English language materials and education available to anyone who wants them, as well as working with other governments to help transform their education systems and increase people's employability through the teaching of English. In a recent report they stated that "the global power of English has helped the UK to grow and maintain its position as a cultural superpower" (British Council, 2013, p. 3).

The United States American Spaces program, sponsored by the United States Department of State, has similar goals. There are more than 800 American Spaces around the world in foreign embassies, libraries and schools, which provide information about

US government, policy and values, and many of which include English teaching programs and dissemination of English language materials (Office of American Spaces, 2014).

In defence of programs such as these, however, Mufwene (2010) reminded us that they are also responding to a demand for English language learning by residents of other countries that has been created primarily by the global economic market.

Two of the most widely used English language teaching programs are the US-based TESOL (Teaching of English to Speakers of Other Languages) and the UK's TEFL (Teaching of English as a Foreign Language). They provide materials for teaching, teacher training, and examinations, as well as providing significant financial gain for the US and the UK (Phillipson, 2011). The UK's English language teaching industry is estimated to contribute more than £2 billion annually to the nation's economy, and this is predicted to increase to as much as £3 billion by 2020. Other financial benefits are gained through the publication and distribution of scholarly and education materials in English (an estimated €13.39 billion from the top five UK publishing companies), and indirect income from more than 600,000 international students who come to the UK to study English each year (British Council, 2013).

English proficiency is also measured in most countries by means of two international tests: TOEFL (developed by a company based in the US) and IELTS (owned jointly by companies in the UK and Australia). These tests are taken by more than one million people annually (Phillipson, 2011). This process tends to reinforce the importance and prestige of "standard" norms of American and British English.

Critics have also argued that the spread of English is a major contributor to the decay of local languages and a threat to their survival (e.g., Phillipson, 2011; Skutnabb-Kangas & Phillipson, 2010). Mufwene (2010) and Joseph (2004), however, disagreed and

argued convincingly that indigenous languages are threatened much more by other indigenous languages spoken by groups who have more economic or social power (what Mufwene refers to as "urban vernaculars") or by regional lingua francas that are important to people for economic or social reasons. Languages survive and spread when they are actually used in everyday interactions in homes and communities, rather than just being taught in schools (Mufwene, 2010).

Speakers of minority languages have long been in a tug-of-war between their natural desire to protect their language (thereby, some argue, protecting and preserving their cultural identity, local customs and sense of community) and embracing the learning of a central or supercentral language (offering the chances for new knowledge, wider options, and greater cultural diversity). De Swaan (2010) summarised this dilemma in a somewhat cynical, but pragmatic, way:

> Recently, a movement aiming to right the wrongs of language hegemony has spread across the western world: it advocates the right of all people to speak the language of their choice, to fight "language imperialism" abroad and "linguicism" at home, to strengthen "language rights" in international law. Alas, *what decides is not the right of human beings to speak whatever language they wish, but the freedom of everyone else to ignore what one says in the language of one's choice.* If, on the other hand, people wish to communicate beyond the narrow circle of their linguistic peers, they have little choice but to learn the (super)central language that links them to wider circles of communication. (p. 65, italics added)

What is English Anyway?

> *An Englishman's way of speaking absolutely classifies him;*
> *The moment he talks he makes some other Englishman despise him.*
> *One common language I'm afraid we'll never get.*
> *Oh, why can't the English learn to set*
>
> *A good example to people whose English is painful to your ears?*
> *The Scotch and the Irish leave you close to tears.*
> *There even are places where English completely disappears.*
> *In America, they haven't used it for years!*
> Alan Jay Lerner (1956)

When I first met my husband-to-be, I could only understand about three-quarters of what he said. He had been born and raised in the southeastern United States; I was from the northeastern part of the country. If asked, we would both have said that we spoke English. Similarly, when I moved to Australia, I found myself often bemused, confused, or amused during conversations with my Australian colleagues and friends, and occasionally felt that I was learning a new language. So what exactly *is* English and how did it come to hold such a prominent place worldwide?

According to the 2013 edition of *Ethnologue*, a global catalogue of languages that was started in 1951, there are currently 7,105 living languages in the world (Lewis et al., 2013). Most of these languages are small and marginalised, however. Only about 150 languages are spoken by 95% of the world population. These languages are usually the ones that are given the status of "national" languages and are used in government, education, commerce and mass entertainment (De Swaan, 2010).

A traditional way that linguists have divided and classified languages is by their historical relatedness based on linguistic features. This classification system begins with the idea of a single ancestor language, or "proto-language," and linguists extrapolate backwards from the present in an attempt to reconstruct the process of divergence. Thus, English is a member of the Low German branch, which is part of the West Germanic

branch of the Proto-Germanic language family, which in turn is a member of the higher-level Indo-European language family (Gramley, 2012).

Languages can also be divided into dialects; however, precisely what defines a *language* and what constitutes a *dialect* is subject to much debate. Many linguists separate the two solely on syntactic, lexigraphic and phonological differences that determine whether different groups of speakers can understand and communicate with each other (Lewis et al., 2013). In this view, for example, formal versions of US English, British English, Australian English, Canadian English, Irish English, and Indian English would all be considered dialects of English. Although the vocabulary and pronunciation might vary considerably, with a bit of effort speakers can all understand each other.

Other scholars take a much broader view of the concept of language. Skutnabb-Kangas and Phillipson (2010) considered the distinctions between languages, and between languages and dialects, as socio-political constructions, while Wei (2013) claimed that languages are "socio-historically constructed" (p. 29). In *Ethnologue*, Fennig (2013) stated that a language is distinguished "not only by intelligibility but also by ethnic, cultural and/or political identity" (para. 4).

Expanding on this idea, Crystal (2007) linked it to the reasons that different languages have been dominant at different periods of history:

> Language has no independent existence, living in some sort of mystical space apart from the people who speak it. Language exists only in the brains and mouths and ears and hands and eyes of its users. When they succeed, on the international stage, their language succeeds. When they fail, their language fails. (p. 7)

He went on to assert that it takes military might to establish a global language and economic power to expand and maintain it. In addition, the development of technology that enables mass and rapid communication over time and space assists in this process.

Thus, the development of the telegraph, telephone, radio, television and, more recently, computers and the Internet have played, and continue to play, major roles in the expansion of English as a global language.

Colonialism and the spread of English. At the beginning of the 17th century, English was spoken by around four million people in what is now known as Great Britain (Gramley, 2012). The era of the widespread "British Empire," upon which the sun famously "never set," began in the early 1600s, when the English established permanent colonies in Jamestown, Virginia and Newfoundland, thus bringing the English language to North America. European and English fishing fleets were also regularly visiting the Grand Banks off Nova Scotia by the middle of the 17th century. By the early 20th century, England had an extensive presence in the Americas, Asia, Southeast Asia, India, Africa, Australia and New Zealand through established colonies, trade (e.g., the East India Company), and the work of religious missionaries (Luscombe, 2013).

The English language has served as a lingua franca in different parts of the world during and since that time. Historically, it has served two different purposes: as a way for the English colonisers to communicate with the people being colonised, and later as a means of communication among the colonised (Canagarajah, 2006). One of the reasons that English became (and often remains) the official or main governmental language of a colonised area is that the land colonised had a large number of different indigenous languages that were mutually unintelligible. Therefore, the colonisers and the indigenous administrators spoke in English, and it became a prestigious language of the elite (De Swaan, 2010).

The United States started becoming a colonial power in the 1890s, imposing English-medium instruction in schools in the Philippines in 1898 (Phillipson & Skutnabb-Kangas, 2013). During the 20th century, the US grew in economic power and its dominant

position was consolidated after the end of World War II. This economic advantage, as well as various international power structures that were created after 1945 (e.g., World Bank, International Monetary Fund, World Trade Organization, the United Nations, and the North Atlantic Treaty Organization), all contributed to the burgeoning spread of the English language on a global scale (Phillipson & Skutnabb-Kangas, 2013).

In the case of both Britain and the United States, much of their power and wealth was achieved at the expense of native languages and cultures, and the exploitation of native people and the natural resources of their homelands. The resulting power imbalance and inequity is at the heart of much of the debate about the impact of English as a means of international communication.

The impact of mass media and the Internet. In recent years, English has become a vehicle for much wider communication through popular entertainment (e.g., music, television, Hollywood films), global advertising, and increasing use of the Internet, especially for social media.

About 80% of the world's 40 million Internet users communicate in English (Bhatia & Ritchie, 2013), even though the vast majority of information and communication technologies users are non-native English speakers (Wei, 2013). Two reasons for this are that most of the major technological developments originally came from the United States, and that companies such as Microsoft carefully control the languages into which they translate their programs (Crystal, 2007; Romaine, 2013).

These technological changes have also altered our perceptions of geographic space when it comes to interactions with others. As Clyne and Sharifzan (2008) pointed out, increasing use of the Internet by corporations and the outsourcing of call centres and similar businesses have made it much more difficult to know whether you are speaking to a local representative or someone in another country. English is the language used in

these interactions, and many companies put significant resources into English training for call centre staff.

English is also the dominant language used for advertising on a global scale, and the amount of English used has been increasing over the past three decades (Bhatia & Ritchie, 2013). Some critics regard English advertising as one more example of the hegemonic and homogenising effects of globalisation and the promotion of English as a global lingua franca. For example, Durand (2006) argued:

> The most common and pervasive examples of social learning situations are television commercials. Commercials suggest that drinking a certain beverage or using a particular hair shampoo will make us popular and win the admiration of attractive people. … The acceptance of English as the new lingua franca has become a socio-cultural norm, which is inculcated to the masses in this fashion. Its quality and pretended usefulness is endlessly reinforced through the mass media. Behind the news, its content and format, behind the talk shows, the press releases, the movies, the fashionable books, and the like, the pretended importance of English becomes a form of dogmatic evidence, not to be questioned. (p. 57)

Others, however, have taken a more positive attitude, saying that advertising actually promotes bilingualism by mixing local languages with English words and phrases that are adapted to suit local situations, in a process known as "glocalisation." In the words of Bhatia and Ritchie (2013):

> The glocalization of English has led to an ever-growing appetite for English in advertising worldwide which has changed and continues to change the quantitative and qualitative patterns of English usage in advertising around the world. This leads us to conclude that language-mixing or mixing of English words with other

> languages is motivated by the deeper demands of creativity, which in turn support the positive and systemic view to language mixing and global bilingualism. (p. 648)

Bilingualism and Multilingualism

A way of "classifying" languages that is extremely relevant for international communication and understanding is De Swaan's (2010) concept of language systems, or sets of language groups. Each group has smaller "peripheral" languages around a common "central" or core language (such as a national language in a multilingual country), and the groups are linked together by bilingual or multilingual speakers in a hierarchical network ranging from local to global. The connections among all of these different language groups form the world language system, allowing communication among most of the world's people.

If you think in terms of language systems, the importance of multilingualism to international communication is immediately apparent. This is also true for communication with people from other linguistic communities within a given country. If we don't speak the language, we are dependent on others to act as intermediaries.

De Swann (2010) noted that many speakers of a central language are bilingual, tending to learn a language that is higher up in the language system hierarchy, and that this type of bilingualism is increasing due to the spread of elementary education and greater access to printed materials and radio programs. On the other hand, it is much less common for native speakers of a central language to learn a peripheral language, leading him to conclude that "*language learning occurs mostly upward"* (p. 57, italics in original).

This has important implications for both education and international communication. In the language system concept, groups of central languages are connected to supercentral languages that are spoken by large numbers of people (generally more than 100 million). These languages are Arabic, (Mandarin) Chinese, English, French, German, Hindi, Japanese, Malay, Portuguese, Russian, Spanish, Swahili, and Turkish. English is currently at the top of the pyramid, serving as a hypercentral language (De Swaan, 2010). It takes time and effort (and often money) to learn another language, so there is little incentive for people to learn languages lower down in the hierarchy, unless they have some specific reason for communicating with a given linguistic group.

Bilingualism and multilingualism can be seen as both individual and group processes (Butler, 2013). Many societies are multilingual, but it doesn't follow that all individuals within that society speak more than one language. In addition, attitudes within a given society can lead to language shifts over time. Wei (2013) noted that individuals are often impacted by community attitudes. If the community attitude towards a given language is negative, individuals are less likely to learn that language.

Being bilingual or multilingual was not always considered to be positive in much of Western society. This was notable in my own experience as a second generation American. My immigrant maternal grandparents made a decision to speak only English, rather than Danish, in the home after their two oldest children had trouble when starting school due to poor English skills. My mother, being one of the younger children, never learned to speak Danish. As a result, my brother and I grew up completely monolingual, until forced to take a "foreign" language in secondary school. This was a strictly academic undertaking that didn't result in either of us gaining any functional knowledge of another language or culture. My personal experience was by no means unique, and is

still a common occurrence: According to the 2009 US Census Bureau statistics, 80% of the population over the age of five were monolingual English speakers despite the fact that US history was in large part, and still is, one of immigration. In most cases, the native language of the immigrant family is largely lost by the third generation (Fishman, 2013).

Research into the topic of linguistic pluralism during the 1950s and 1960s often used a deficit model, considering monolingualism as the normative standard and the goal to be attained (Burck, 2005). During the first half of the 20th century, in societies that were primarily monolingual, many psychologists felt that being bilingual meant that a person had "two conflicting personalities whose shifting linguistic allegiances imply shifting political allegiances and moral commitments" (Pavlenko, 2006, p. 2). Pavlenko went on to assert that, although the perception of bilingualism as "linguistic schizophrenia" has lessened in recent years due to greater international migration of people and greater ethnic consciousness, this view has still not completely disappeared.

Popular thought during the early 20th century was also that one language was acquired at the expense of another in a subtractive fashion. Mixing of two or more languages when speaking was considered by most people to show that bilingual speakers were somehow "linguistically deficient" (Bhatia & Ritchie, 2013, p. 569). More recent studies in brain function and capacity, however, have indicated that this is not necessarily true. The process of learning or developing more than one language is generally additive if both languages continue to be valued and useful to the individual (Edwards, 2013). Well-structured bilingual education programs that help students develop and maintain their native language(s) as well as becoming proficient in the dominant language of their country or region, or dual language programs that encourage children from both minority and majority groups to become fully bilingual, can have an additive effect and help

develop students who are "bilingual, biliterate, and bicultural" (Wright, 2013, p. 659). Initial instruction in native languages has also been shown to make it easier for children to learn additional languages in the future (Phillipson, 2011).

Edwards (2013) pointed out that bilingualism or multilingualism increases a person's capacity because, in addition to having a greater choice of language in which to express things, it has been shown to have some distinct educational advantages. Recent studies have indicated that bilingual children are better at selectively identifying meaningful information and disregarding misleading details in both verbal and nonverbal domains, a process that is essential in problem solving (Bialystok, 2013). The ability to function in more than one language has also been shown to help people think in flexible ways and to improve their ability to view issues from multiple perspectives (Burck, 2005).

English as a Lingua Franca (ELF)

Numerous scholars (e.g., Crystal, 2007; Meierkord, 2012; Mufwene, 2010) have pointed out that the present is not the first time that a given language, in this case English, has achieved dominance as a lingua franca*,* a term that has long been used to describe a language that enabled people from different linguistic backgrounds to communicate with each other. The oldest known lingua franca was used among traders in the Mediterranean region starting in the 11th century AD, and it was this language that gave rise to the term (Meierkord, 2012). Since that time, numerous languages, pidgins or creoles have served as lingua franca in various regions of the world.

Current research literature is rife with varying definitions of the term "English as lingua franca." Originally, the term was used by researchers to describe interactions *only* among non-native English speakers (Meierkord, 2012). Native English speakers were

intentionally kept out of early ELF studies because it was felt that their contributions would "contaminate" the data (Park & Wee, 2011). However, as pointed out by Baker (2009), many native English speakers engage in international communication. This is especially true of communication at high political levels dealing with global environmental problems and science issues, which usually involves both native and non-native speakers.

The definition of ELF was later expanded to include native English speakers. Seidelhofer (2005), for example, described it as "a way of referring to communication in English among speakers with different first languages" (p. 339). Phillipson (2011), on the other hand, argued vehemently against the use of the term to include native speakers:

> I would claim that *lingua franca* is a **pernicious**, invidious term if the language in question is a first language for some people but for others a foreign language, such communication typically being asymmetrical. I would claim that it is a **misleading** term if the language is supposed to be neutral and disconnected from culture, from its uses, and the purposes it serves. (p. 458, emphasis in original)

Another area of disagreement among ELF researchers is whether their studies should be primarily about the *form* of the language or its *function* as used among non-native speakers. Seidlhofer (2005), Jenkins (2007), and Jenkins et al. (2011) claimed that one of the key tenets of ELF is that it is primarily driven by non-native speakers and is thus changing the "standard" forms of English (such as what is generally called British English or American English). ELF speakers, they felt, are developing different norms of communication in English, leading to new lexical, syntactic and phonological features. They presented ELF as an emerging "variety" of English and are among those researchers who are trying to develop a "corpus" of terms and grammatical structures used by ELF speakers. This initiative is driven in part to inform ESL or EFL teaching strategies,

because they believe that it is unfair to expect English learners to acquire native speaker norms.

Park and Wee (2011) argued against the ELF's project focus, claiming that it is counterproductive in promoting equality in international communication. They felt that it actually helps to polarise the problem because of two basic assumptions: that native speaker norms are different from non-native speaker norms on a fundamental level, and that the group with the largest number of speakers must abide by the norms of the other.

There is also a danger of over-simplifying by referring simply to "native" and "non-native" speakers in international interactions. As Seargeant (2008) pointed out, there are complex, varied, and specific social factors that affect the status of English in any given society. Therefore, as he noted, "for a clear understanding of the way that the language operates in any one society . . . analysis of the actual circumstances of existence needs to be made, and these circumstances require dedicated and context-specific studies of their own" (pp. 224-225).

Business English as lingua franca (BELF) and Academic English as lingua franca (AELF) are two key sub-disciplines that have developed out of ELF research. Health research is another area where ELF concepts are being applied. Each of these disciplines has a slightly different perspective and focus; however, the findings about problems and resolutions that are pertinent to my research are very similar, so I will discuss them together in the following sections.

Issues of mutual understanding. Despite the differences of opinion about the definition of terms, insights from ELF and related research about the problems encountered in cross-language interactions, and the strategies speakers use to develop mutual understanding, are relevant to my study.

A variety of factors are involved in creating an understanding between two or more speakers. Some of the factors are specifically language-related, involving aspects such as what language is used, pronunciation, vocabulary, and word order. Others are more situational or cultural in nature. Smith and Nelson (2006) defined three different aspects of understanding language that I found useful in my study: intelligibility (recognising the words), comprehensibility (understanding the meaning of the words), and interpretability (understanding the meaning behind the words).

Consider the following excerpt from a popular British novel. A woman says to a man who is visiting her: "There's a copy of *The Times* on the bench. See if you can help me with eight down. It's been driving me mad" (E. James, 2005, p. 57). The words in these sentences are quite simple, so a person with a basic knowledge of English would probably understand them – that is, the words themselves are intelligible (assuming, of course, that the man could understand the woman's pronunciation) and probably comprehensible to the listener. To interpret them, however, and understand what the woman meant, her listener would need some cultural reference points. First of all, he would need to know that *The Times* is a newspaper. Then, he would need to be familiar with crossword puzzles. Finally, he would have to understand that the phrase "driving me mad" is a colloquial expression that has nothing to do with transportation or anger, and is not to be taken literally.

Two different problems may occur in a discourse depending on which factors are problematic: non-understanding is when the listener has no idea what the speaker meant (issues of intelligibility or comprehensibility), and misunderstanding occurs when the listener understands but misinterprets what the speaker meant (Kaur, 2010).

Speech accommodation strategies. ELF or BELF speakers work together in a number of different ways to minimise issues of non-understanding or misunderstanding

when interacting. These are commonly known as accommodation strategies (Canagarajah, 2006).

Among the key factors supporting this type of communication appear to be the *awareness* of the speakers that they come from different linguistic backgrounds, and their *willingness to make an effort* to understand each other (Park & Wee, 2011). Pullen (2010) also found this in her study of the role of "small talk" in building rapport among international business colleagues in Switzerland. She noted that "flexibility and the need to negotiate meaning and be resourceful are important factors in effective communication between business partners with different linguistic and cultural backgrounds" (p. 470), and that this was particularly true when there was a significant difference in the linguistic abilities of the various participants in a discussion.

In successful interactions, the participants focus on each other as people and on the purpose of the discussion, rather than worrying about using correct grammar (Seidlhofer, 2009). They do not take understanding for granted, but monitor the conversation along the way through the use of questions and responses to make sure they are understanding each other (Jenkins et al., 2011). Other accommodation strategies include repetition, paraphrasing, and the simplification of sentences by breaking them into shorter segments (Kaur, 2010; Meierkord, 2012). Topicalisation is another common tactic, which means moving the most important information to the beginning of the sentence (Canagarajah, 2006). Successful interactions also tend to include a cultural sensitivity to the best ways of interrupting, taking turns in conversation, and using culturally appropriate forms of address (Sweeny & Hua, 2010).

People in business or academic settings are connected by shared goals and common interests, as well as a certain level of domain-specific shared vocabulary. The willingness to cooperate to achieve common goals is generally more important than a

native speaker competence in the language, and this helps keep misunderstandings to a minimum (Erling & Walton, 2007; Jenkins et al., 2011). Health research, on the other hand, shows very different results, and misunderstandings due to language appear to be more common, in part because of a (perceived) power imbalance between doctor or nurse and patient, and a lack of intercultural awareness or training on the part of the health professional (Penn & Evans, 2009; Roberts, Moss, Wass, Sarangi, & Jones, 2005).

The "native speaker problem." Some research has indicated that native English speakers often pose the greatest problem in international discussions. They can be hard to understand because they tend to speak very rapidly and use more complicated vocabulary and grammar, as well as idiomatic expressions that are often unfamiliar to speakers from other countries and cultures (Ehrenreich, 2010; Sweeny & Hua, 2010).

Cultural norms may also be different, and this can affect both the process and the outcomes of interactions. This has been identified as a particular issue in health care in multicultural settings. In their studies of a London medical clinic, Roberts et al. (2005) noted that "over 20% of *all* consultations were with patients with limited English and contained major and often extended misunderstandings" (p. 467, italics in original). They attributed these misunderstandings to a combination of language problems (such as pronunciation, syllable stress, and limited vocabulary) and cultural differences in the way of presenting information, rather than to culturally specific health beliefs. They remarked:

> In spoken encounters it is not possible to separate ways of talking from cultural assumptions: for example, how direct to be, how much background detail to give before the main point, whether interrupting someone is rude or friendly or what topics are permissible to discuss. (p. 466)

Janssens et al. (2004) pointed out that a common language enables communication but may "reflect and reinforce the perspective of the dominant individual

or subgroup" (p. 426). This may be especially problematic when there is a disproportionately high percentage of native speakers in a group (Pullin, 2010). Native speakers have a distinct advantage because of their greater fluency and often, consciously or unconsciously, use that to their advantage. In discussing BELF studies done in a German multinational corporation, Ehrenreich (2010) noted that three out of four interviewees agreed that native speakers "frequently use their native competence as an instrument of power, a fact they find extremely irritating. In addition, native speakers are described (and have, in fact, been observed by the author) as fairly inconsiderate interlocutors with apparently little accommodation skills" (p. 422).

The issue can be further compounded by a lack of confidence on the part of non-native speakers, which can also be detrimental to building good relations with native speakers. In their BELF studies, Sweeny and Hua (2010) found that many non-native English speakers expressed the opinion that their own lack of fluency in English was a large part of the problem. In consequence, "they begin interactions already feeling frustrated by their inability to express their ideas fully and spontaneously" (p. 479).

Erling and Walton (2007) highlighted another important issue that they noted from their interviews with employees of multinational corporations in Berlin. Language proficiency often had a greater impact on decision-making processes than expert knowledge about the problem under discussion, which had the potential to result in less than optimal results:

> When a problem arises, it is discussed among the team members in search of a solution. But the discussion becomes complicated when there is a non-German speaker present and, as a result, the meeting has to be held in English. Levels of English ability vary among the team members, and people with expert knowledge do not always speak the language well. This means that, for linguistic reasons,

> experts may be restricted in their ability to present arguments clearly. However, those who speak English well may use the opportunity to argue without expert knowledge, as a result of which the discussions at such meetings may lead to unsatisfactory solutions. (p. 37)

These insights from health studies and international business indicate that international communication about global environmental issues could be improved if native English speakers put a greater focus not only on learning other languages, but also on developing "greater cross-cultural awareness and increased knowledge of the different norms associated with different languages" and "a deeper understanding of their own communication style, the problems that it could pose, and the relationship between communication and the goal of the interaction" (Sweeny & Hua, 2010, p. 500).

Building rapport: The importance of small talk. The use of "small talk" (Pullin, 2010, p. 458) or "safe talk" (Planken, 2005, p. 397) – for example, discussions about universal subjects such as music, food, or animals – can be used to stimulate cultural curiosity, rather than animosity, and give participants a chance to build rapport and trust in each other. In addition, international business studies have shown that "informal chat was perceived to account for a greater percentage of employee communication than formal oral communication situations, such as company presentations, and video and teleconferencing" (Charles, 2006, p. 271).

For many foreign language speakers who are working in formal settings such as a business or academic environment, this type of informal conversation is more difficult. Many of them have learned the language in a particular environment and thus have no problem with technical or scientific terms that are used in their work, but they have a more limited vocabulary in other areas. They are less comfortable with everyday conversation, often fearing that incorrect grammar or other mistakes will reflect poorly on

their professional competence (Charles, 2006; Tange & Lauring, 2009). Discussing personal or emotional matters, expressing opinions, negotiating assertively and understanding nuances in the conversation are perceived as the most difficult areas (Charles, 2006; Ehrenreich, 2010).

These linguistic limitations, or perceptions of inadequacy that often occur even when non-native speakers are quite fluent, may lead to a couple of different problems that limit intercultural communication and the flow of information. One of these is "language clustering," where people tend to speak informally, share knowledge and cooperate principally with other members who share a similar language or culture (Mäkelä, Kalla, & Piekkari, 2006). This means that little information is exchanged across linguistic and cultural boundaries within the organisation as a whole, and much knowledge remains in small isolated pockets (Tange & Lauring, 2009).

The second communication barrier, termed "thin communication" by Tange and Lauring (2009), refers to the withdrawal of people from any nonessential communication when the conversations are held in a language that is not native to them. This can negatively affect the flow of information within the organisation and the establishment of rapport among colleagues, both of which are needed for effective collaboration and problem-solving.

The Languages of Science

In 2003, a leading international journal of applied linguistics, called the AILA Review, adopted an "English-only" policy for publication. Prior to that time, authors could write in either English or French. This change was particularly ironic because the name of the journal is an acronym for *Association Internationale de Linguistique*

Appliquée, reflecting the fact that when the association was founded in 1964, the leading language used was French (Hamel, 2007).

Some authors (e.g., Walter, 1996, cited by Hamel, 2007) have argued that, historically, Western science has been dominated by a single language starting with Sumerian, through Greek, Arabic and Latin. During the Renaissance in the 15th century, however, linguistic diversity increased as science became more popularised, instead of being solely the pursuit of an intellectual elite. Languages such as French, English, German, Italian and Russian were then commonly used for science and scientific debate (Hamel, 2007).

By the start of the 20th century, three languages had attained dominance in scientific discourse – English, French and German. Geology and political economy were dominated by English, while German was used in the fields of biology, chemistry and medicine, and French was the primary language of psychology, law and political science (Draguns, 2001; Hamel, 2007).

A trend towards English dominance in all fields of science was noticeable after the 1930s, and has accelerated in recent decades (Ammon, 2006). This trend towards a monolingual approach has been especially noticeable in the so-called "natural" sciences such as chemistry, biology, physics and mathematics. An analysis of leading international science journals indicated that the percentage of natural science articles in English rose from around 35% in 1880 to more than 90% in 2005 (Ammon, 2010). The situation is similar, but not quite as extreme, in the social sciences, with 82.5% of articles being written in English. These are not absolute numbers because they are based on figures from bibliographic databanks, which may be skewed in favour of English publications (Ammon, 2010). In addition, most analyses don't include scientific books, which are

especially important in the social sciences and which include a wider range of languages (Hamel, 2005).

International communication in science is often looked at through the narrow lens of a select few international journals that have high impact factors – a somewhat self-perpetuating issue as these journals feature prominently in the Citation Indexes, which means even more people cite them, which in turn gives them an even higher factor. This also encourages more journals, as well as individual scientists, to publish in English rather than in their native language. Scientific journals are usually not included in the Citation Indexes if they publish in languages other than English. This increases the pressure on researchers to publish in English, especially since scientists and their research are increasingly being evaluated on the basis of the number of citations their publications receive (Ammon, 2006).

The proportional growth of English language publications masks a significant increase in science publications in other languages, as scientific research is expanding rapidly worldwide (Hamel, 2007). These other-language publications, however, tend to be limited in their reach only to people in the same linguistic community – for example, French publications are international within French-speaking countries, but are rarely translated to other languages (Draguns, 2001). In addition, few researchers from outside the specific linguistic community submit articles to these publications. Ammon (2006) has shown that, based on statistics from two bibliographic databanks *(Biological Abstracts* and *Math Sci Disc)*, the number of non-German scientists publishing in German language periodicals decreased dramatically over the last few decades. In his analysis of French, German and Spanish geography journals over the period from 2005 to 2009, Bajerski (2011) found that an average of 90% of the authors and 85% of the citations came from the same language area as the journal. He also found that the majority of the

authors and citations (up to 98% in German journals) were European, suggesting that these publications have limited influence outside of Europe. These findings indicate a phenomenon similar to the language clustering and thin communication noted in multinational corporations, which may limit the flow of ideas and creativity among the global scientific community. One of the reasons for this appears to be somewhat of a self-imposed linguistic isolationism on the part of both English speakers and non-English speakers, as readers tend to focus only on publications in their own languages (Ammon, 2006).

This issue is not limited to the publication of research results. English is also the most common language used for international scientific conferences, correspondence among colleagues, networking, guest lectures, and coursework reading at the university level (Ammon, 2006). Major universities in non-Anglophone countries are now offering science courses in English in an effort to raise their international profile and attract students from abroad (Ammon, 2010). From 2003 to 2008, courses taught in English in the world's universities tripled, principally in the field of engineering sciences. This is especially true in Scandinavian countries and the Netherlands where many universities now use English at the primary medium of instruction (Meierkord, 2012).

The trend towards a monolingual international scientific community poses many issues for non-native English speakers, and for the future of science itself, that have been addressed at length by numerous scholars (e.g., Ammon, 2006; Draguns, 2001; Durand, 2006; Hamel, 2007, 2010; Phillipson, 2011). They have argued that an over-reliance on one, or a few, languages will limit the genesis of new scientific models and creativity because language is an integral part of how our thought processes work. Draguns (2001) illustrated that the field of psychology, in particular, is "dependent on language for the source of its concepts" (p. 1024), and he gives examples of common terminology derived

from several languages – *ustanovka* (Russian), *décalage* (French), *amae* (Japanese), and *simpatía* (Spanish).

Other issues for non-native speakers include the costs of learning and working in English, both in terms of money and time. This is especially true for those whose native languages are linguistically distant from English (e.g., Chinese, Arabic, Greenlandic) and those for whom English may be a third or fourth language.

It takes a high level of English fluency to write a scholarly paper, and this is not easily achieved. Ammon (2006) found that only one in 20 randomly chosen German professors of English felt that they were capable of writing a publishable paper in English without native speaker help. Even with this help, it takes more time to write and have the English text checked for accuracy, and the results may still not achieve native speaker norms, in which case the research may be judged by others as being of lower quality. This problem extends beyond just an understanding of the actual English vocabulary and grammar, and includes the accepted norms of structure and flow of the text, which require authors to write in a style that may be very different from the traditions of their own native language.

Academics in medical and social sciences at the Universidad Nacional Autónoma de México (UNAM) identified oral conference presentations in English as their most difficult language barrier, followed by writing academic articles. They also felt that their lack of linguistic abilities limited them in many aspects of their professional lives. García Landa (2006) wrote:

> Academics in this study reported having lost opportunities for academic interchange with colleagues due their linguistic limitations. In this way, they had not been able to attend academic events, publish in a foreign language or get grants for doing research, for postgraduate study or for taking a sabbatical abroad.

> Maintaining contact with non-Spanish-speaking colleagues has also been limited as a consequence. (p. 74)

In some cases, such as at UNAM, the push to publish in English is also reinforced by the university's policies because salaries are linked to "merit" and academics receive more points for publishing in English language journals than in Mexican ones (García Landa, 2006; Hamel, 2005). In addition, research has indicated that texts written in English are often judged as better than ones in other languages, even when the content is exactly the same (Ammon, 2006).

A lack of resources in their home countries or institutions was noted as a limiting factor in overcoming difficulties of this sort by both Ammon (2006) and García Landa (2006). On a more hopeful note, Hamel (2005) and Ammon (2006) both observed that in applied sciences, or aspects of science that are primarily focused on matters of regional or national interest, scientific research and communication are still thriving in local languages. This is of prime importance in environmental research and the search for solutions to environmental problems. A key issue in addressing global environmental issues is to find ways to broaden the visibility and impact of this research outside of the sphere that is currently limited by language.

The Environment, Emotions, and Language

> *If you talk to a man in a language he understands, that goes to his head. If you talk to him in his language, that goes to his heart.* (Nelson Mandela, quoted in Ginsburgh & Weber, 2011)

Some years ago, I was involved in a study of effective community-based coastal resource management in the state of Hawai'i in the United States. At that time, I (Zicus, 2003) noted:

> As a society, we are becoming increasingly disconnected from the natural environment, and the visible links between the health of local and global ecosystems and the quality of our lives are becoming progressively less obvious. Our food, clothing, housing products, and other material goods are shipped in from all parts of the world. More and more, we interact with the natural world through television, computers, and other electronic media. As a result, we *know* far more about our world and *understand* less, at least in an emotional sense. If environmental education is going to be effective as a conservation tool, it is necessary to go beyond intellectual understanding to engage the emotions and make the issues personal. (p. 345, italics in original)

Since I wrote those words in 2003, this tendency to view our world in a virtual way, rather than through direct experience, has increased dramatically, especially among the younger generations. This observation was reinforced by Richard Louv in his prize-winning book *Last child in the woods* (2008) as he lamented:

> Our society is teaching young people to avoid direct experience in nature. That lesson is delivered in schools, families, even organizations devoted to the outdoors, and codified into the legal and regulatory structures of many of our communities. Our institutions, urban/suburban design, and cultural attitudes unconsciously associate nature with doom – while disassociating the outdoors from joy and solitude. Well-meaning public-school systems, media, and parents are effectively scaring children out of the woods and fields. (pp. 2-3)

Psychological research has indicated that attitudes that are formed by direct experience tend to be affectively-based and more likely to engage the emotions, while indirect experience leads to cognitively-based attitudes (Millar & Millar, 1996). An

important question arises from this: How does our growing disassociation with nature affect our environmental understanding and consequent behaviour?

A second question, more closely related to my research, concerns the relationship between language and emotion. There is little doubt that emotions play an important role in motivating behaviour. Most of the research to date, however, seems to focus on how environmentalists or environmental educators can use emotions to make people care about the issues and change their behaviour accordingly. There has been little research specifically related to the interplay of multiple languages (or the use of English or another language as a lingua franca), emotion, and the resulting impacts on international dialogues and action on environmental issues.

This is not an area of major focus in my research as it is too far out of my area of expertise. However, I think it is important to keep it in mind as a significant part of the overall communication process. I have included here a brief review of some basic background information from research literature in various branches of psychology (e.g., environmental, developmental, cognitive, and linguistic) and also considered it when coding and analysing my research data.

The role of emotion in environmental protection. Climate change and other large-scale environmental problems now make headlines almost daily in newspaper, television and Internet news. As a result, there is increasing research interest focusing on how our emotions are related to our concern for the environment, and how they influence our environmental practices (e.g., Farbotko & McGregor, 2010; Harth, Leach, & Kessler, 2013; Hipólito, 2011; Perrin, 2011; Pooley & O'Connor, 2000).

Emotions, and the deliberate manipulation of those emotions, are at the heart of much environmental discussion and controversy. As Harth et al. (2013) pointed out:

> Environmental NGOs tend to make people feel guilty, highlighting humans' responsibility for climate change; the media tend to fuel anger about environmental disasters, whereas politicians often try to invoke pride in the ecological and technological achievements that suggest optimism about the future. (p. 18)

Although it is generally accepted that emotions play an important role in motivating behavioural change, studies have disagreed on how messages promoting environmentally-sensitive behaviour should be framed (whether to provoke either positive or negative emotions) for maximum effectiveness (Perrin, 2011). Searles (2010) found in her study of television public service announcements in the United States that emotional appeals that had a positive message tended to encourage pro-environmental behaviour, while those that were negatively framed gave rise to anxiety on the part of the viewers and were, consequently, counterproductive to motivating change. Some studies dealing with risk assessment, on the other hand, have indicated that more negative messages (i.e., those promoting a perception of greater immediate risk) were more effective up to a certain point. If the risk is perceived as being too remote or too great to deal with effectively, negative emotions such as despair, depression, or indifference can result (Lombardi & Sinatra, 2013; Roeser, 2012). There are also increasing ethical and moral concerns about the deliberate manipulation of emotions to persuade others to believe or act in certain ways.

Emotion, of course, is not the only factor affecting environmental behaviour. Factors such as scientific knowledge about the problem, understanding of possible actions and belief in their efficacy, socio-cultural aspects, peer pressure, monetary costs (or perceived costs), and personal goals also play significant roles (Burke, Prior, & Spehr, 2010).

A feeling of having personal command of a situation is especially important in environmental negotiations and collaborations. In addition to creating a feeling of helplessness, a perceived lack of control may engender a protective reaction where people attempt to regain control through mechanisms such as increased territoriality or demands for more personal space (Gifford, 2007). This is an area where I believe that the languages used and the participants' language abilities can have a major effect on international dialogues about environmental issues.

Impacts of language on emotions. When discussing bilingualism, emotions, and mental health, Martinovic and Altarriba (2013) commented that the languages we know help us label our emotions, thereby giving us access to certain emotional concepts that we can use to "identify, understand, and label what we feel and how we experience events" (p. 294).

Besemeres (2006) agreed with this, adding that these available emotion concepts "contribute to how we interpret what we feel, how we experience it, even how we act on it" (p. 55). She also discussed how multilingual authors express emotions when writing, noting that these authors perceived emotions as arising from a combination of culture and individual experience that was often difficult to describe in a different language:

> Their writings also reveal how their feelings are shaped by concepts specific to a particular language, a medium they share with other speakers. Outside of that language, it becomes harder to talk about those feelings, to have them recognized. Emotions as seen by these authors, then are both culturally shaped and individually experienced. Insofar as they write of the absence of direct counterparts in English to the emotion words they use in their other languages, their narratives lend support to a view of emotions as culturally relative, rather than universal. (p. 36)

Language specificity and the cultural relativity of emotions are important points to consider, and ones that, in my personal experience, are often overlooked or not understood by monolingual speakers who assume an emotional universality. In addition, as Ehrenreich (2010) found in multinational business contexts, speakers felt their linguistic limitations most strongly when they were dealing with emotional issues or areas of conflict. Both of these are significant factors in discussions about the environment and negotiations about the best ways to deal with environmental problems.

How and when a person learns an additional language appear to affect his or her representation of emotion in that language. Emotions experienced in childhood may be encoded in the brain in a person's native language, and these codes can be used as reference points for thoughts and feelings in the future (Silva, 2000). Dewaele (2010) also found from a large web-based survey undertaken with Aneta Pavlenko that participants who had learned a language later in life or had learned it primarily through formal classes were less likely to use that language to express their feelings. This does not imply that people of different linguistic backgrounds will *feel* differently or experience the same emotion in a different way; merely that they may have different perspectives with which to interpret and express their own and other peoples' experiences (Pavlenko, 2008).

A person's level of proficiency with a language is also a factor when it comes to expressing emotions in that language. People who have a strong command of another language may choose to use a second or third language to express certain emotions, especially if they feel it is more appropriate culturally. Burck (2005) and Dewaele (2002) both gave examples of Chinese and Japanese respondents who said that they would normally use English to express strong emotions such as anger because it was not considered appropriate to do so in their native cultures. However, these researchers also pointed out that foreign language speakers do not have the same freedom to deviate from

native speaker norms (such as making jokes, being sarcastic, or using slang or certain swear words) when talking because their words are often interpreted differently by native speakers than they would be if another native speaker used the same expressions.

Bilingual or multilingual respondents in these studies often said that they felt less intense emotions when speaking in a second language and were therefore more able to discuss things in a rational manner. However, this type of communication needs constant awareness to avoid misunderstandings, as exemplified in Burck's study (2005):

> For some of these individuals, speaking a new language had honed their communication, forcing them to concentrate on essentials, which they saw as beneficial to their relationships. This aspect of communication in a second language can sometimes elicit significant issues quickly. Individuals cannot dissemble so easily in a new language. However, the interactions between first- and second-language speakers point to the importance of taking the effections of being positioned in a second language into account, to avoid mistaken ideas about persons and personalities being constructed. (p. 192)

In summary, there appears to be both positive and negative potential in relation to cross-linguistic communication about the environment. On the negative side, the emotional distancing from the issues being discussed, or the lack of ability to express the desired emotions, may lead to misunderstanding or perceived indifference, as well as power imbalances. The fact that so much environmental scientific research is conducted in English, with the results also being presented in English, may limit people's abilities or desires to become emotionally involved in the issues on a personal level, thus potentially limiting their participation in environmental issues. On the positive side, when all participants respect each other, and are aware of the potential difficulties and the need to

accommodate, this emotional distancing may help people focus more easily and rationally on the essential and most significant points under discussion or negotiation.

Summary

The study of cross-cultural and cross-linguistic communication is extremely multifaceted, and it has been addressed by researchers from many different disciplines. The previous review was by no means exhaustive; however, the literature mentioned helped inform my research in the following ways:

- Globalisation studies "set the stage," providing the background upon which programs such as IPY operate.
- Literature from ELF, BELF and multicultural health research helped me understand some of the issues, mechanics and strategies involved in cross-linguistic communication.
- Critical theorists reminded me of the need to consider the specific contexts of interactions, and to be aware of issues of power and hegemony when making inferences or drawing conclusions.
- Research into language issues in science helped put the IPY experience into a more specific context.
- Finally, a brief look at the interplay of emotions, language and environmental action underscored the holistic and incredibly complex nature of the issues I was investigating.

Chapter 3: Research Methodologies

I approached my research under the broad framework of *social constructivism*, with the belief that human beings create and validate knowledge through their interactions. This epistemology developed from years of research begun in the early 1900s by noted educational psychologists such as John Dewey, Kurt Levin, Jean Piaget, Lev Vygotsky and Jerome Bruner. The theory holds that the essence of learning is making connections, linking new information to prior knowledge, and testing its application in real-world situations. At the same time, knowledge is a social construction that reflects the perspectives, experiences, and values of the people and cultures that construct it (Young, 1992). The key tenets of social constructivism in education are that:

- individuals construct their own unique world views out of personal experience;
- the process of knowledge construction is incremental – adding to, making connections with, and modifying previously established constructs;
- constructs are normalised through interactions with others; and
- the process of normalisation through interactions with others constitutes teaching.

I used a mixed-methods qualitative research approach combining elements of grounded theory with situational analysis, ethnography and autoethnography, case studies, and action research. Methodological purists, especially those who consider themselves classic grounded theorists (e.g., Glaser, 1992; Glaser & Strauss, 1967; Holton, 2007), might argue that this dilutes the power of the methodology to generate theory. My intent, however, was to formulate substantive theories that might prove of practical help in improving cross-linguistic communication, especially as related to global scientific and environmental issues, rather than the creation of broad, widely-applicable abstract theory. Numerous researchers (e.g., Clarke & Friese, 2007; Dick, 2007; Morse, 2007; Timmermans & Tavory, 2007) have argued convincingly that these approaches are not

mutually exclusive and can complement each other when carefully applied. I discuss these different methodologies below and show how and why I applied them in my research.

Constructivist Grounded Theory

The grounded theory method was first developed by sociologists Glaser and Strauss in 1967 as a systematic way of conducting research aimed at the development of causal explanations (i.e., theories) about how things work (Bernard & Ryan, 2012). Under grounded theory, researchers begin analysis early in the data collection process and continue to work with both facets simultaneously in an iterative process that allows for modification when needed (Bryant & Charmaz, 2007).

One of the key concepts in grounded theory lies in the use of "theoretical sampling," meaning that the choice of interview respondents is not completely predetermined at the start of the research. Coding and analysis begin after the first interview and, as new ideas "emerge" from the data and new questions arise, the researcher deliberately looks for people who can shed light on those questions and ideas (Glaser, 1992, 2007; Glaser & Strauss, 1967). In addition, as noted by Morse (2007), it is crucial to choose the right participants. Participants must be "experts in the experience or the phenomena under investigation; they must be willing to participate, and have the time to share the necessary information; and they must be reflective, willing, and able to speak articulately about the experience" (p. 231). In this research, I chose to begin the interview process with people who had been actively involved with international education and outreach during IPY because they met these criteria.

Glaser and Strauss later diverged in their thinking about grounded theory and two competing paradigms developed, with Glaser maintaining a mostly inductive approach

and Strauss tending more towards deductive reasoning. Glaser stayed with a two-step approach: coding the data and then reassembling it to form theoretical categories. Strauss' approach is less objectivist. He introduced the concept of "axial coding" as a third step to look for relationships among concepts (Bernard & Ryan, 2012).

Kathy Charmaz (2000) further developed the concept of what she termed "constructivist grounded theory" because she felt that traditional grounded theory "accepts the positivistic assumption of an external world that can be described, analyzed, explained, and predicted: truth, but with a small t" (p. 524). In her view, researchers and informants interact in an interview to create the data together, with an emphasis on developing meaning. Constructivist grounded theory "emphasizes how data, analysis, *and methodological strategies* become constructed and takes into account the research contexts and researchers' positions, perspectives, priorities, and interactions" (Bryant & Charmaz, 2007, p. 10, italics in original). This is the orientation I have taken in this research because I was investigating complex issues in a number of different contexts and with people from a wide range of countries, cultures and professional backgrounds. Therefore, although I framed my research as case studies (described in more detail below), I used grounded theory as a basis for my data collection and analysis.

Situational Analysis

Situational analysis can add another layer of depth to a grounded theory study because it acknowledges the inherent "messiness" of social phenomena and helps avoid a tendency to reductionist thinking that can be imposed during the process of coding qualitative data. This approach recognises that every situation is unique, and that changes in any of the elements of the situation could, and probably would, alter the outcome. It is predicated on the idea that understanding interactions among contextual variables and the

interdependence of individuals, social systems, and other influences is necessary for constructing meaning as well as for managing situations (Annan, 2005).

In situational analysis, the situation itself (e.g., how, where and when the interactions take place, who is involved and in what ways, under what particular circumstances, etc.) is a key unit for analysis. As Clarke and Friese argued (2007):

> In situational analysis, the conditions *of* the situation are *in* the situation. The conditional elements of the situation need to be specified in the analysis of the situation itself as *they are constitutive of it,* not merely surrounding it or framing it or contributing to it. (p. 364, italics in original)

They went on to emphasise that "society as a whole, then, can be conceptualized as consisting of layered mosaics of social worlds and arenas that are constantly in flux" (p. 364).

As noted by Newbury (2011), situational analysis is a tool that can be used "not to clarify or predict normative patterns, but to open up the multiple elements we see in a situation (p. 95)" in a way that will help us gain fresh perspectives. It is a cyclical, rather than linear process, with new cycles evolving as new information comes to light, and is focused on discovering causal relationships, rather than "truths" (Annan, 2005).

Newbury (2011) also reminded me that these conditional elements cannot all be determined beforehand, nor could I know for certain what was central to a given situation. Therefore, it was important to keep an open mind when beginning the analysis. Conceptual mapping at a variety of scales is one way to do this. Clarke and Star (2007) discussed three different mapping approaches they used to understand and gain different perspectives on their data:

- *Situational maps* diagram the relationships amongst the principal elements of the situation under investigation.

- *Social worlds/arenas maps* look at the collective actors, non-human elements such as institutions and social organisation, and areas of concern at a mesoscale level.
- *Positional maps* illustrate the full range of stances taken by the actors involved, where and how their positions differ, and highlight the various areas of concern or controversy in the specific situation.

Clarke (2005) recommended starting with what she calls "messy maps," which are basically a diagrammatic brainstorming, to record all of the possible elements that might impact on or affect the situation. These can be revisited and revised as often as necessary during the process of the research. As the researcher develops a better understanding of the factors at play, he or she can start to add lines connecting the elements to illustrate possible relations among them, eventually leading to more ordered maps.

These mapping techniques proved extremely helpful when I was organising my data and analysing the country-specific factors (such as national language policies and education systems) that influenced perspectives towards English and also when I was considering how the different professional and personal backgrounds of my respondents related to their ideas and attitudes.

Ethnography/Autoethnography

The word "ethnography" is of Greek origin, from *ethnos*, meaning (non-Greek) people or tribes, and *graphia*, or writing. The primary objective of ethnography is "to describe and interpret a specific culture or social group" (O'Byrne, 2007, p. 1382). The term was first used in English around 1830, and by the latter part of the 19th century, ethnographic approaches were often used in social and cultural anthropology (Jones, 2010). It came to the forefront in the early 20th century with the publication of classic (and now, much criticised) studies such as Bronisław Malinowski's *Argonauts of the*

Western Pacific (1922) and Margaret Mead's well-known *Coming of age in Samoa* (1943, originally published in 1928).

The field of ethnography has expanded and diversified into various sub-fields since the days of Malinowski and Mead, but the objective and the principle components have remained much the same. What has changed over time is the definition of a "culture" or "social group," and an ethnographic approach is now often used in fields as diverse as organisational management and international business (e.g., Ehrenreich, 2010; Pullin, 2010; Vaara, Tienari, Piekkari, & Santti, 2005), schools and education systems (e.g., Pahl, 2012; Rowsell, 2012), and practices of health care researchers and providers (e.g., Burbank, 2011; Gagnon, Carnevale, Mehta, Rousseau, & Stewart, 2013). Ethnographic approaches can also be used to study a researcher's own culture, rather than just outside groups (e.g., Karra & Nelson, 2008).

Ethnographic studies are based on rigorous systematic interviewing and observations that are then analysed, interpreted and described in detail by the researcher (Karra & Nelson, 2008). Carol Grbich (1998) defined ethnography as having four essentials components:

- The purpose of the study is to explore social phenomena.
- Coding may be started before data collection is finished.
- It is based on a single case or a small number of cases.
- The data are analysed qualitatively.

In traditional ethnography, researchers approached the subjects in their studies from the perspective of outsiders (Hammersley & Atkinson, 2005). Although they might have used methods varying from simple observation to participant observation, they tried to keep themselves out of the research as much as possible, fearing that getting too close

to the culture being studied would bias their findings. Developing too close a relationship to the subjects of the study was sometimes criticised as "going native."

Recently, there has been a growing awareness that it is impossible to separate the researcher completely from the researched, leading to an increase in acceptance of studies that are autoethnographic in nature. In these studies, the researcher uses his or her own experiences (in a greater or lesser degree) as a part of the study. As Brigg and Bleiker (2010) expressed it:

> Our efforts to know, to justify or ground our categories and inferences, invariably fall back upon some aspect of being human. We cannot escape, in short, the fact that social science research requires that *we are both the subject and object of inquiry*. This brings into play factors that derive from our involvement with others, such as language, identity, culture and historical context. It is not possible to entirely separate the object or issue to be studied from the values, experiences and societal influences an observer brings to his or her analysis. (p. 784, italics added)

In autoethnographic studies, researchers can focus on their own culture or on some aspect of their own experience that relates to larger research objectives. They can also choose to focus on a culture that is foreign to themselves, either as adopted and accepted members of that culture or by examining how the culture relates to themselves (Ellis & Bochner, 2003).

Brigg and Bleiker (2010) also emphasised the importance of "transparency," stressing that in using an autoethnographic approach the researcher should show as clearly as possible how he or she was involved in the research. O'Byrne (2007) agreed with this, stating that "the presentation of research should reveal how an author moved through various research processes and interpreted his or her interactions with others, the world, the data collected and the prior literature on the topic" (p. 796).

My study combined aspects of traditional ethnography (observation and description of "others" in the second stage) with autoethnography (my personal experiences as a participant in the programs and processes being researched). The IPY EOC community was a social group, or community of practice, formed of individuals from many different countries who were working together with a common objective, essentially forming a polar education "culture." As co-chair of the EOC committee, I was an integral part of that community. In the second stage of the research, I was working as a participant-observer with a group of environmentalists and educators in an attempt to develop and assess a cross-cultural, cross-linguistic project for students in four countries.

Case Studies

Both stages of my research were framed as case studies. I chose this approach because case studies are a natural research design for use with grounded theory and ethnographic or autoethnographic approaches, as well as for the application of situational analysis. They are situated in a given time and space, with specific actors and organisational features, and must be analysed as such. They also reflect inherently complex and socially-constructed "realities" that require a holistic, rather than a reductionist, approach to understanding them (Lincoln & Guba, 1986).

Yin (2003) provided an often quoted definition of a case study as "an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between the object of study and context are not clearly evident" (p. 13). He went on to point out that this requires multiple sources of evidence and triangulation of these sources to help establish trustworthiness. He and Stake (2006) both agreed that case studies can be particularly valuable in answering "how" or "why"

questions, especially in cases where the researcher has little control over either the actions of others or the events that take place.

Case studies can be approached with the goal of theory-building, or as a means of providing information for practitioners that can help them improve their practice. Some researchers clearly separate these two functions (e.g., Dul & Hak, 2008), arguing that separate designs are needed for theory-building as opposed to a goal of improving practice, and that the results are beneficial only to a specific audience (e.g., academics vs. practitioners). Others such as Corcoran et al. (2004) felt that practitioners can benefit from good theory that is generated through case studies because their reflection on the emerging theory can also help them reflect on their practice and stimulate changes in the way they approach their work. This is the orientation I have taken in my study.

Yin (1994, 2003) also discussed the advantages and disadvantages of single-case versus multiple-case studies. He noted that single-case studies may be appropriate where cases are extremely rare or unusual, or where there is already a strongly formulated theory and the research is intended to help confirm or refute the theory. Multiple-case studies, on the other hand, are better for developing theory because they allow deeper investigation into a single issue, or a broader investigation into a variety of issues across several cases.

Case study methodology has often been criticised as lacking rigour, or not being "scientific" as it is very difficult to "prove" or replicate because each case is unique. Yin (2003) emphasised that the purpose of a case study is to stimulate the formation of theories and hypotheses, rather than to generate statistical data and, thus, it needs to be evaluated in a different way than traditional quantitative studies. In 1981, Guba designated four components that are still often used to increase what he termed the "trustworthiness" of case study research (McGloin, 2008):

Truth value: This refers to how confident the researcher is that his or her research reflects the underlying truth of the study's findings. Truth value can be enhanced by use of techniques such as peer review, asking respondents to review and validate the findings, and reflexivity on the part of the researcher(s).

Applicability: This is a consideration of how widely the findings can be applied to other cases or situations. Although Yin (1994) admitted that this is not always appropriate, especially with single-case studies, one way of increasing the potential applicability is to use a multiple-case or cross-case methodology (Gibbert, Ruigrok, & Wicki, 2008; Lincoln & Guba, 1986; Yin, 2003).

Consistency: Guba (1981) used this term to denote whether or not the data were consistent enough that the results would be the same if the study were replicated, while admitting that there is always a great deal of variability because of the naturalistic approach of case study research. He then suggested the use of the term "dependability" and said that this could be improved through transparency of the data collection and analysis process. Lincoln and Guba (1986) suggested again that consistency could also be increased through the use of multiple-case studies. If two or more cases support the same theory, but do not support other equally plausible theories, this can be considered replication.

Neutrality: As much as possible, case studies should reflect findings that are a result of the case itself – the people and conditions related to them – rather than preconceived ideas or biases on the part of the researcher. The use of data triangulation, peer review, participant feedback, and reflexivity on the part of the researcher can help maintain neutrality.

In my research, the first stage (IPY EOC) can be considered as a single-case study that used a grounded theory approach to generate initial ideas about ways that cross-

linguistic and cross-cultural communication might be improved. The second stage (SoP) used an exploratory multiple-case study approach with four interlinked cases in four different countries to test the applicability of these ideas in other contexts. This use of multiple cases also helped determine the trustworthiness, as defined above, of the insights gained during the first stage.

Action Research

The concept of action research has enjoyed a revival in recent years, and is now being applied to everything from community-based resource management, to improvements in education practice and social justice movements (Zicus, 2003). It is grounded in constructivism, and was used by many of the educational psychologists mentioned earlier who developed the concept of social constructivism. Precise definitions of action research vary according to personal philosophies and the goals of the research practitioners. Most definitions, however, share certain common elements (Holly, Arhar, & Kasten, 2009; Mills, 2007; Rapoport, 1970; Schmuck, 1997):

- Action research generally refers to research that is done in the field to solve a practical problem, *by those who are directly involved in, or affected by, the problem*. This practical aspect is one of the key features that distinguish it from traditional research.
- It is planned and systematic, but it is local in scope and is based on ideas of improving practice, continued personal and professional development, and incorporating multiple perspectives.
- It does not claim to be objective or value-neutral.
- It tends to use qualitative approaches to data collection and analysis.

- It includes a large component of self-reflexivity on the part of the researchers and practitioners.

Action research and grounded theory share many features and can be used complementarily. Both methods use actual evidence to support theory development (Dick, 2007), and both include iterative or cyclical processes and self-reflexivity. In their studies of ways to help psychiatric patients, Teram, Shachter and Stalker (2005) argued for the use of grounded theory to develop an initial theoretical understanding of the issues, followed by a participatory action research approach to test the understandings and help their patients improve their mental health. They contended that this combination of methodologies can improve the validity of a qualitative study because grounded theory provides rigorous data collection, and participatory action research generates data from the participants' perspectives with less danger of bias due to leading questions from the researcher. Following this example, I used grounded theory in the first stage of my research to develop an initial theoretical understanding of key issues in intercultural and cross-linguistic communication. In the second stage, employing an action research approach, I worked with several teachers to implement and test these understandings.

Data Collection and Methods of Analysis

My initial research focus was to gain the perspectives of educators, communicators and scientists who had worked on a specific international environmental program. To do this, I conducted semi-structured Skype, telephone or face-to-face interviews with key IPY EOC committee and working group people about their experiences during IPY. The initial respondents were chosen in accordance with Morse's (2007) recommendations because they were people who had been very active during IPY and therefore had the requisite expertise, interest, and willingness to discuss their

experiences and provide thoughtful insights into the issues surrounding cross-linguistic communication and collaboration.

Data in the second stage of the research were gathered using an exploratory multiple-case study approach as espoused by Yin (1994) and Stake (2006). There were four interlinked cases: a youth environmental group in Malaysia, a high school English class in Brazil, a student environmental club at a rural school in southernmost Chile, and two science teachers and their classes in Greenland. The cases were all identified through the initial interviews completed in the first stage of the research. The groups cooperated in the development of an international environmental outreach project that allowed primary and secondary school children from the four countries to communicate with each other about climate change and other environmental issues of concern to them.

In order to protect the anonymity of my interview respondents, I have not used identifiers when quoting them in the discussion sections. In cases where I felt particular information was important, I have listed the country or continent they were from, whether they were scientific researchers or educators, or if they were native English speakers (NES) or non-native English speakers (NNES). In other cases, they are just listed as respondents.

I taped the interviews and then transcribed them verbatim. In the transcriptions, I noted what seemed to me to be significant pauses or emotional responses such as laughter or strong emphasis on particular words or phrases, but I did not attempt to time the length of the pauses or note all of the "ums" and "ahs." My focus was on the meaning – the essence of the communication – rather than the linguistic features. I translated interviews conducted in Spanish into English as I transcribed them. As recommended by Squires (2009), I had these transcriptions reviewed for accuracy by a native Spanish speaker who

also works in polar research and education and is therefore familiar with the specific terminology.

In keeping with the general principles of grounded theory methodology, I began analysing, comparing, and doing initial coding of the data in the early stages and then continued with simultaneous coding and data collection. I started open coding of the first interviews using a provisional "start list" of codes as recommended by Basit (2003). I don't think it is possible to begin analysis without some preliminary codes, however vague, because the very fact of interviewing presupposes that some mental constructs already exist in the researcher's mind. We always start with some idea of what we are looking for, or we wouldn't even be able to form reasonable questions. I tried to remain open-minded, however, and constantly compared the data to the codes, looking for new relevant themes and constructs to explore further. A list of the initial codes is shown in Appendix 2.

During the coding process, I was looking for both salience and centrality, following the definitions given by Bernard and Ryan (2012) in their discussion of grounded theory:

> Salience is about how often a concept appears in the data. The more often a concept appears – particularly if it appears across many respondents and in many situations – the more important it is likely to be. Centrality is about the degree to which a concept is linked to other concepts. Concepts that are linked to many others are likely to be at the core of – that is, central to – any model. (p. 127)

Research Cautions and Study Limitations

This study was naturally limited by both time and available resources. Below, I discuss some additional concerns that should be considered by those reading and interpreting my research results.

Case studies, by their very nature, are snapshots embedded in a specific time and place. They can give us valuable insights into processes and human perceptions, but they do not provide universal truths (Zicus, 2003). Therefore, care must be taken in assessing the transferability of the results to other situations.

The case studies in Stage 2 took place in four different countries that had different cultures, colonial histories and very different attitudes towards English and English teaching. However, comparing across the cases to determine what appear to be key commonalities or differences allows for a level of analytical generalisation. As Mason (2002) expressed it:

> By making comparisons between these contexts you can then produce cross-contextual generalities that are derived from an understanding of processes or phenomena in specific contexts, that are strategically compared. This is a particularly strong way of generalizing from qualitative data because it is based on a logic of demonstrating how context and explanation are intimately connected, and which uses rather than glosses over specificity and difference. (pp. 196-197)

It is also important to note that the statements and conclusions in the discussion section are my personal interpretation of interviews and observations of events. To make this transparent, I have followed the practice of Welch and Piekkari (2006) who acknowledged that it is not always possible to separate the effects of language ability from other factors such as personality or external circumstances when analysing interview data. Therefore, where there is uncertainty, I use terms such as it “seemed” or

"appeared" in my written descriptions rather than more definite expressions such as "it was."

Researching in multicultural and multilingual settings. Working across cultures and languages adds a further dimension of complexity to any research methodology. This complexity involves all levels of the research – ontological, epistemological and axiological.

A common saying among geographers is that "all maps lie flat, and all flat maps lie." This reflects the idea that, as the Earth is a three-dimensional sphere, a flat two-dimensional map cannot replicate reality in a truly accurate way. The same concept could be applied to interviews and conversations. No two people hear and interpret a statement in exactly the same way, even if they both have the same linguistic and cultural background. Understanding is always filtered through a person's unique life experience, and we interpret statements not only on the words we hear, but also on the speaker's intonation, accent, pauses, and other non-verbal cues. These disconnections of understanding can be even greater in conversations with people from different linguistic backgrounds. Conducting interviews in English with non-native English speakers, especially with those who spoke less fluent English, may have affected the quality of the information I received. Burck (2005) noticed that miscommunications happened frequently when she was interviewing immigrants to the United Kingdom. She identified two different reasons for this, and went on to give her opinion that the misunderstandings were probably even more common than were readily apparent:

> Second-language speakers in these accounts were engaged in miscommunications in two ways. One was when they were listened to as if they were first-language speakers, where tone and a mismatch of assumptions disrupted communication. The other was when the prosodic

> elements of the language, the marking of their speech as second-language speakers, disrupted communication. Obviously these accounts could only include misinterpretations which were made apparent – the likelihood of such misconstructions occurring seems great. (p. 108)

This potential for misunderstanding was something that I had to keep in the forefront of my mind throughout the study. I tried to minimise it through a combination of questioning and rephrasing to assure that both the respondent and I felt confident that we understood each other.

Translation or working through an interpreter can be equally problematic. Some of the potential areas of concern identified by Squires (2009) in her review of methodological challenges in conducting cross-language qualitative research include:

- *Maintaining conceptual equivalence:* The translated phrases or sentences should still mean what the speaker intended, even if there is no way to do a direct translation (because one language doesn't have a word for a particular concept) or when a word-for-word translation would be interpreted differently by the listener because of cultural or linguistic differences.
- *Experience and qualifications of the translator or interpreter:* A skilled, qualified translator or interpreter is essential to maintain "cross-language trustworthiness." The quality of the final data depends of the quality of the translations.
- *The role of the translator or interpreter during the research:* In qualitative research, the translator or interpreter helps to create the research data through their own personal and cultural interpretations of what the speakers say and mean, so this should be clearly acknowledged as an integral part of the research.
- *Choosing the right research approach:* Phenomenological approaches are generally not appropriate for cross-language studies because the nuances and

richness of the language that gives depth to such studies can be too easily lost in the process of translation. On the other hand, different approaches to capture peoples' experiences, such as narrative analysis or ethnographic approaches can generally be adapted to cross-language studies.

In addition to the issues of language, cultural differences between the researcher and research participants (or co-researchers) must also be considered. Schmieding and Kokuyama (1995), Kapborg and Berterö (2002), Laverack and Brown (2003), and Irvine et al. (2007) all emphasised the importance of becoming knowledgeable about the cultural mores and customs of the research participants before starting the research. This not only makes it less likely that you will inadvertently insult someone or cause offense; it also reduces the chances of misunderstandings and miscommunications.

It is worth noting, as well, that much of the literature in the field of cross-cultural and multilingual research was either written by native English speakers or written in English by non-native speakers. This might have an impact on the theoretical grounding of all studies of this nature. As discussed earlier in Chapter 2, our language provides us with access to certain emotional constructs that can influence how we think and act. There is also evidence showing that bilingual individuals will often give slightly different responses to the same questions depending on which language they use to reply, especially when answering questions that involve their emotions (Edwards, 2013).

I conducted the interviews in Stage 1 in English. Although all of the participants were at least moderately fluent in English, and in most cases extremely fluent, this is still an area that needed careful consideration. Since the use of English across language boundaries was the main topic of the interviews, this is something that we discussed in detail during the interview process, which should help with this concern.

For the Stage 2 case studies, the language issues were different, but still needed continual care and reflection. I am quite fluent in Spanish, although not a native speaker, and did not need to work with either a translator or interpreter while researching in Chile. I conducted interviews in Spanish and could also ask for clarification in interviews and conversations if there was anything I didn't understand. When working with the youth environmental group in Malaysia, the everyday working language of the adult facilitators was English and most of the youth participants spoke at least an intermediate level of English, although it also involved a lot of code-switching with Malay. I have a basic conversational level of Indonesian, which is a language that is closely related to Malay, but I had to work with translators or interpreters in some situations. In Brazil, my primary contact was a Brazilian English teacher, who spoke fluent English. I am also able to understand a fair amount of Portuguese because of its relationship to Spanish, and can read Portuguese with the aid of a dictionary. Greenland was the most challenging country in which to work, as I speak neither Greenlandic nor Danish and was therefore reliant on the English-speaking abilities of both my Greenlandic and Danish contacts.

These language issues can be seen as both a weakness and a strength of the research. On one hand, my lack of fluency in the local languages could have led to imperfect understanding or a superficial understanding of conversations and cultures. On the other hand, it reflected a real-world situation that required all of us to work through the language difficulties to arrive at mutual understanding and to collaborate on various projects. This is one of the main reasons that I have chosen to incorporate an autoethnographic aspect into the research.

Legitimation and representation. In his thought-provoking book *A geopolitics of academic writing*, Canagarajah (2002) reflected on his experiences as an academic at the University of Jaffna in Sri Lanka (an example of what he calls the "periphery" of

international scholarship) and his later work at universities in the United States (or the "centre"). He commented on the tensions he has encountered in trying to represent his Sri Lankan colleagues and call attention to the difficulties they face working and publishing from the periphery, now that he himself is working from the centre. He admitted that he had to change his style of discourse to meet the standards of mainstream academic journals and, as a result, he has had to make ideological compromises. His portrayal of the problems faced by periphery academics was criticised by some of his Sri Lankan colleagues when he asked for their comments because they felt that he was presenting a Western ideology in his approach. The irony of the fact that he has, in a sense, become party to the same hegemonic approach that he is criticising has not escaped him.

I am aware that similar criticisms could be made about my research in this study. I am a native English speaker with dual Australian-US citizenship (therefore very much from the centre), but I am attempting to present the views of non-native speakers of English from a variety of different cultures. In all of the case studies in Stage 2, I was invited to participate by the project leaders because they felt that my research had the potential to benefit their efforts. This put me in a position of both privilege and responsibility. To ensure that I have not misrepresented them or their work, I gave them the opportunity to review and comment on their interview transcripts, and make adjustments if they felt something was not represented correctly.

My analysis of the results of this study should be interpreted with caution. I do not intend to imply that my suggestions and strategies for improvement of international communication are all-encompassing or that they would be appropriate for all people and all situations. All of the respondents who participated in formal interviews had post-secondary education and an interest in science, the environment, or education, and most of them spoke fairly fluent English. In addition, they all believed that we are facing

environmental problems that are global in scope and require international cooperation, and they were interested in being part of that process. In addition, the initial respondents were all people who had been sufficiently motivated to become and remain active in the IPY program over a period of two to four years. They are therefore not necessarily representative of the population in general. Although it would have been interesting to interview people who started participating but then dropped out of the program, that was unfortunately outside the parameters of this study.

In addition, the IPY interviews in the first stage did not include representatives from any Asian countries other than Malaysia, because there had been little participation in the international education planning or international EOC projects by people in other Asian countries during IPY. I think there are two possible reasons for this. Our use of English for all of our sessions was probably a limiting factor. Another contributing factor may have been that IPY EOC was a "bottom-up" initiative that was initiated and carried out principally by individuals. This may have made participation more difficult in countries that have more of a "top-down" approach where permission to participate in such activities needs prior approvals at high levels.

Summary

This qualitative study was conducted under the framework of social constructivism, using a mixed-methodology that combined constructivist grounded theory, situational analysis, and traditional and autoethnographic approaches. Both stages of the research were framed as case studies. Stage 1 was a single case focused on IPY EOC participants and initiatives, while Stage 2 used four interlinked cases from four different countries where teachers, youth leaders and students worked together to explore and compare their environments. This gave me the opportunity to validate concepts and

ideas that emerged from Stage 1. Stage 2 also employed an action research approach so that the participants could define and address issues and problems that were relevant to them, and that could help them improve their own practices.

The next two chapters examine each of the research stages in detail, including background information, data collection and analysis, and a discussion of the findings.

Chapter 4: International Polar Year – Description, Analysis and Findings

In this chapter, I first describe in detail the rationale behind the IPY EOC program, the program structure, and the international projects and initiatives that were undertaken during the four-year period that the program was active. After that, I discuss my methods of data collection and the analysis of data related to my first four broad research questions:

1. In the perspectives of members of the international EOC community, did the use of English affect their participation in meetings and events and, if so, in what ways?
2. How did this impact our decisions about what international activities to undertake?
3. How did it influence people's decisions about whether or not to participate in the activities?
4. What lessons can we learn from the experience to improve this type of international collaboration in the future?

I then review the key findings from the research questions and summarise the main issues and suggestions brought up by the respondents. Findings from both stages of the research have been synthesised in Chapter 6.

Background and Rationale

IPY 2007-2008 was one of the largest coordinated scientific research efforts of the last 50 years. Overall, the program included 170 funded international projects, 38 formal national IPY committees or contact people, researchers from more than 60 countries, resulting in an estimated total of 50,000 participants including scientists, students, educators, and technical and administrative support (Salmon et al., 2011). The formally endorsed projects, in both the Arctic and the Antarctic, were broadly classified according

to their main area of focus (Earth, Land, People, Ocean, Ice, Atmosphere, Space, and Education and Outreach) as well as their geographical region of interest (See Figure 3).

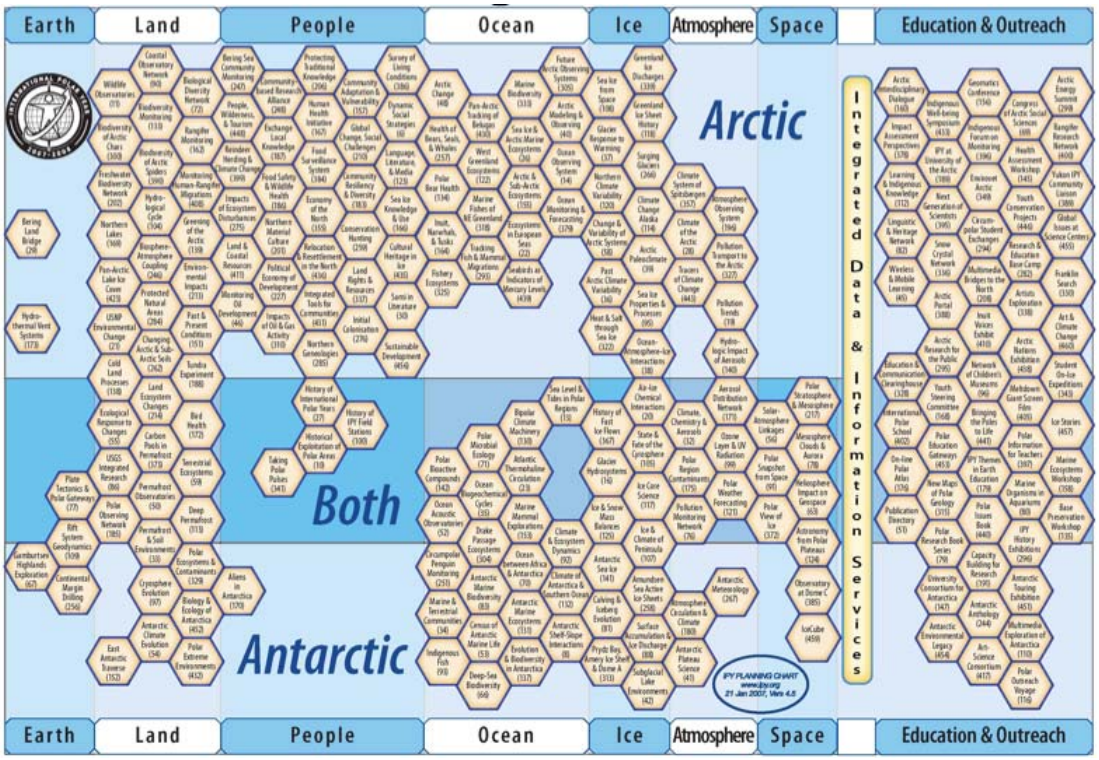

Figure 3. IPY research and EOC projects (From http://www.IPY.org)

During the preparation stage in 2004, ICSU and WMO appointed a Joint Committee (JC) consisting of 14 pre-eminent polar scientists and five *ex officio* members from 12 different countries to oversee program planning and implementation (Allison & Krupnick, 2011). Although it was officially called the International Polar Year 2007-2008, the actual "year" of observation and research extended from 1 March 2007 to 1 March 2009, to allow a for full-year cycle of research in both the Arctic and the Antarctic. The overall program was administered by a three-person staff of the IPY International Programme Office (IPO), which was based at the British Antarctic Survey in the UK.

The JC identified four major goals for the program: to make major advances in knowledge about the polar regions; to develop improved observational systems for future monitoring; to create a new generation of polar scientists and engineers; and to interest and engage people from all sectors of society, including polar residents, schoolchildren, the general public and decision-makers (Salmon et al., 2011).

The importance of a public education and outreach component was highlighted early in the planning process. ICSU and WMO realised that if they wanted to capitalise on the research and highlight its importance globally, they needed effective ways to reach the public, as well as the ability to develop international cooperation and partnerships within the science community. The JC decided that it would be valuable to have an international group of educators and communicators to coordinate this effort, so they formed an advisory Sub-Committee of the JC (the IPY EOC committee) that was mandated to work with specialised education, outreach and communication institutions and centres to "engage the awareness, interest and understanding of schoolchildren, the general public and decision-makers worldwide in the purpose and value of polar research and monitoring" (ICSU IPY 2007-2008 Planning Group, 2004, p. 11).

The initial committee was composed of nine members from 10 countries who were specialists in media relations, education (formal and informal), science communication, and various arts. The committee membership was later expanded to 14, representing 11 countries. The committee was revamped again in late 2009 to prepare for the 2010 Oslo IPY Science Conference. At that time, there were 14 official members and 10 ex-officio members from 14 countries (Zicus et al., 2011).

In addition to the EOC committee projects, all officially endorsed IPY science research projects were required to include their own plans for an education or outreach component; although in actuality many of these remained limited to the training of

university students. Some countries had relatively well-funded IPY National Committees that supported outreach and education efforts at their national level. However, researchers and educators in many other countries lacked funding for such activities. The international EOC efforts were focused on helping these countries with their efforts through a grassroots development of partnerships and volunteer networks with support from the IPO (Salmon et al., 2011).

The first face-to-face meeting of the full IPY EOC committee took place in October 2006 in Bremerhaven, Germany. At that time, I was appointed co-chair and served in that post until the committee was disbanded in July 2010. By the time of this first meeting, the 14-member committee included seven native English speakers (two Australian, one Canadian, two from the UK, and two from the US), although only four of these attended the meeting. In addition, the director, education and outreach officer, and administrator of the IPO were all native English speakers. This over-representation of native English speakers undoubtedly had an effect on the committee functioning, and helped spark my initial interest in this research.

The EOC action plan. During the Bremerhaven meeting the committee developed an action plan that served as a guideline for future EOC decisions and work, although it was modified and refined as time progressed and needs changed. We started by asking the question: "Why are the polar regions and polar research important to all people on Earth?" Through discussion about this question we framed the overall theme: *Polar Science – Global Impact.* This was further subdivided into three main priorities (Zicus et al., 2011):

- Shrinking snow and ice: Rapid change in the polar regions;
- Global linkages: Interactions between the poles and the rest of the Earth; and

- Neighbours in the North: Living in the Arctic, and human impacts on the polar regions.

Due to limited time and financial resources, we decided to focus primarily on key partners who could serve as conduits to a wider audience. These included teachers in formal and non-formal settings; media officers and science journalists; university undergraduates, postgraduates, and early career polar scientists; and senior IPY researchers. We also developed partnerships with polar tour operators, museums, artists, and political advisors (Salmon et al., 2011).

Most of the committee work after the Bremerhaven meeting was carried out through telephone conference calls and e-mails. The official launch of IPY took place on 1 May 2007 at the Palais de la Découverte, a science museum in Paris, France. In the lead-up to this event, the committee and various working group members had fortnightly telephone conference calls to discuss media plans, organise resources, build up a global educators' network, and develop a launch activity for teachers around the world.

There were an additional four face-to-face EOC committee meetings that were sponsored by various IPY partners over the 2007 to 2009 period. These meetings helped maintain enthusiasm among the committee members, and allowed extended time for discussion, reflection, review, and planning for future events. Selected members of the various working groups also attended one or more of these meetings to provide additional input and perspectives (Zicus et al., 2011).

EOC working groups. At the Bremerhaven meeting, we had developed the concept of international "working groups" to carry out specific projects. The working groups included members of the EOC committee, as well as other interested educators, communicators, artists, and members of the Association of Polar Early Career Scientists (APECS). Working group membership was fluid and the groups continually evolved and

changed throughout the period of IPY in order to adapt to the varying needs and priorities. The groups kept in contact with each other through a combination of regular telephone conference calls, Skype calls, e-mails, Google Groups, and web and video conferences. The original working groups were:

- *Formal Education*: Professionals from primary through tertiary education would be responsible for selecting and promoting educational resources, supporting teachers, and developing student opportunities. This group later split into two groups with one focusing on primary and secondary school teachers and students, and the other on tertiary education.
- *Informal Education*: Educators in museums, science centres, and similar venues would focus on networking, sharing resources, and promoting IPY events and activities internationally. This group eventually merged with the formal education group because we realised that most IPY activities could be incorporated into both formal and informal education settings, and would serve the needs and interests of both.
- *Media*: Media professionals concentrated on development of an internationally coordinated media campaign, the fostering of local and national interest, the writing and dissemination of press releases, and facilitation of media visits to the polar regions.
- *Community Building*: The community-building group was intended to provide a direct link between the EOC committee and community-building activities occurring within pre-existing networks of youth, early career scientists, artists and Arctic communities. This group never really solidified, however, because the goals were too vague and unstructured.

- *Products, Services, Events*: This flexible working group was created to help develop the IPY website and help with similar projects.

IPY website. The website was the main channel of distribution about the different IPY science and social science projects, general information about the polar regions, publicity related to international polar-related events, and educational resources. For example, for the official launch of IPY, the education working group created a flyer with background information about IPY and two simple hands-on activities about ice. EOC volunteers translated this material into French, German, Inuktitut, Italian, Japanese, Portuguese, and Spanish, and it was posted on the IPY website with links to related activities and resources. The IPY web team combined a Google Earth map with a free on-line geobrowser tool called Tagzania to create a page where people could launch a "virtual balloon" showing their location and make comments about the ice experiments or their interest in IPY. On the day of the launch, 251 "balloons" were launched from 31 different countries (Zicus et al., 2011).

International Polar Days. Building on the success of the launch activity, the EOC committee and working groups decided to hold quarterly international "Polar Days," with each Day focused on one of the main areas of IPY research: sea ice, ice sheets, changing Earth, land and life, people, above the poles, and oceans. The Days were originally planned to take place around the equinoxes and solstices (illustrating the extreme conditions in the polar regions), but this had to be adapted to suit school calendars around the world.

The education groups worked together to produce both a two-page summary of the science and a flyer with a simple educational activity related to the theme of each Polar Day. These were translated by volunteers into various languages, and then posted on the IPY website and distributed throughout the education networks. The languages

varied with each of the Days, depending on the volunteers available and willing to do the translations. We also continued the virtual balloon launches, and the media working group prepared and distributed press releases about both the scientific research and the outreach activities.

The Days grew in popularity and complexity as we went along. Many of them included "live events" where students and other interested people could speak directly with IPY researchers and ask questions. We worked with IPY scientists and various partner organisations who hosted web-casts, video-conferences and radio programs. The Days eventually became Polar Weeks because of their popularity and so that we could incorporate multiple events and time zones. People from an estimated 49 countries took part in one or more of these events (Provencher et al., 2011).

Polar resource book. The success of Polar Days was largely due to the collaborative efforts of researchers and educators. Members of APECS and the EOC committee wanted to continue to strengthen this partnership, as well as to respond to requests from teachers for additional resources. The two groups worked together, with the coordination of the IPO, to write and publish an interdisciplinary book, *Polar science and global climate: An international resource for education and outreach* (2010).

The book contains background information about IPY and polar research, hands-on educational activities for use in both the classroom and the field, descriptions of IPY education and outreach projects, examples of best practices in education that were developed and refined through IPY activities, tips for scientists presenting their research to non-technical audiences, and an indigenous perspective on the importance of IPY for polar research in the Circumpolar North.

We solicited contributions for the book through IPY groups and networks, and received 142 submissions of intent from participants from 17 countries. We then formed a

Polar Resource Book (PRB) Development working group to review the submissions based on agreed-upon criteria. This working group included members from Australia, Brazil, Canada, Germany, Malaysia, the Netherlands, New Zealand, the UK, and the US. The group members used web-based media such as Skype, Dropbox, Google Groups, and YouSendIt to work together across time zones and continents (Zicus et al., 2011).

The working group spent three weeks reviewing the submissions and requested full submissions from selected contributors. These contributors were given a month to submit a completed activity or project description, including photographs, diagrams and other supporting materials. The working group also identified topic gaps in submissions for the educational activities chapter and solicited additional activities addressing specific topics.

After the full submissions for education activities were received, I was hired by the IPO to complete and edit the chapter. This required writing background information for different sections and activities, combining similar submissions into a joint activity, and standardising the format of the activities. When this was completed, each activity was reviewed by two scientists who were specialists in the topic covered, and two educators who tested the activity and commented on its educational appropriateness. I revised the activities following this review and then forwarded them to the original submitters for their approval.

An editorial team composed of a general editor from Germany and two associate editors (I was one and the other was from the UK) worked together to tie the various sections of the book together and complete the project. The book was published in English in June 2010. Since that time, there have been various suggestions and requests for translation into other languages; however, due to lack of resources, this has not occurred.

IPY science conferences. In June 2010, the Oslo IPY Science Conference was held in Norway to disseminate the early results of IPY science and social science research. The EOC committee worked with the conference organisers to incorporate a strong education component that included EOC presentations and posters, a community polar event at the waterfront, a polar film festival and an international teacher workshop. All conference participants were given a copy of the recently completed book *Polar science and global climate: An international resource for education and outreach* (2010).

The two-day teacher workshop took place just prior to the conference. The Research Council of Norway provided funding for 114 teachers from 21 countries to attend the workshop plus the entire conference, providing them a reduced conference fee, lodging and most meals. The University of Alaska-Fairbanks also gave the teachers an opportunity to receive two graduate-level credits. The workshop was conducted entirely in English, which was also the only official language of the science conference. The workshop received high praise from the teachers who attended. It is worth noting, however, that 76 of the 114 participants were from English-speaking countries: 49 from the US, 21 Canadian, four Australian, and one each from New Zealand and the UK.

A similar conference and teacher workshop was held in Montreal, Quebec, Canada in 2012. This resulted in the formation of the Polar Educators International network, which is described in more detail below.

International networks as a legacy from IPY. Two international networking organisations developed out of IPY EOC and have been growing steadily since their inception. Both of these organisations have recognised a need to work across multiple languages and are making efforts to improve their capacity in this area.

Association of Polar Early Career Scientists (APECS). At the beginning of IPY, a group of young scientists formed an International Youth Steering Committee (YSC)

with the goal of strengthening communication about polar science through their interactions with school children and the general public, and encouraging and supporting the next generation of researchers. Two members of the YSC, Jenny Baeseman from the US and Hugues Lantuit of Germany, started discussing the need for long-term support for postgraduate students and early researchers as they started their careers. Working together with the IPO, they formed an organisation to help fill this need and to promote international and interdisciplinary collaborative projects (Baeseman, Xavier, Lantuit, & Taylor, 2011). This organisation was called the Association of Polar Early Career Scientists (APECS).

APECS provides a platform and a support network to increase interaction among young or early career researchers, and fosters their career development through a monthly newsletter (currently in English only), as well as web-based workshops and presentations. APECS also encourages their members to take an active role in public education and outreach.

By the end of September 2013, APECS had more than 4,200 members from 79 different countries. In addition, there were 29 active national or regional committees, 10 of which were established within the last year. While about 70% of APECS membership is concentrated in North America and Europe, membership is increasing in other parts of the world, including Asia and South America (APECS, 2013).

Polar Educators International (PEI). During the second IPY polar teachers' workshop that was held in Montreal in 2012, attending teachers expressed an interest in forming a network to help them stay connected and enable them to share resources after they returned to their own countries. A working group was formed to develop a vision and strategy for the organisation. They decided on the following broad goals (PEI, 2013b):

- to develop and foster relationships on local, national, and international levels that will result in collaborations, resources and activities that are both culturally and regionally relevant;
- to provide professional development opportunities for educators and scientists;
- to develop working partnerships with other relevant organisations; and
- to create a useful website containing reliable and accurate resources.

The organisation structure includes a Council of 16 members who are elected for a one-year term, an elected four-person Executive Council, a seven-person volunteer group of Focus Advisors (to share their polar expertise), and five appointed Global Advisors (to promote international inclusivity).

As of 29 November 2013, PEI had 250 members from 24 different countries (PEI, 2013a). A look at the composition of the Council and associated groups, however, highlights a potential concern with the international nature of the organisation. The 16-person inaugural Council was composed of 12 people from the US, one person who represented both the US and New Zealand, one from Canada, one from Italy, and one from Portugal. The Executive Council consists of three people from the US and one from US/New Zealand. The Focus Advisors group has five members from the US, one from the UK, and one from Germany. The Global Advisors represent Australia, Belgium, Brazil, India, and Italy.

According to the live statistics on the PEI website (as of 19 January 2014), 64.85% of all visits to the site were from the United States, followed by 5.93% from New Zealand, and 4.67% from Canada. Part of this may be due to the fact that the Executive Council was heavily involved in the creation of the website, since parts of it were still under development. However, the statistics do highlight the potential issue of domination

of the organisation by native English speakers, especially from the United States, which is something that needs to be kept in mind by the Council.

An international PEI teacher workshop was held in Portugal in 2013. During that workshop, attendees were asked to complete a short survey about language issues. I had no part in preparing this survey, although sections of it were based on some of the questions I had asked during my interviews with other IPY EOC people. While the survey was of limited size (14 responses) and the information to be gained was limited by the way the questions were framed (mostly yes/no questions, without explanation as to the reason for the response), there were a few interesting insights. After eliminating the three native English-speaking respondents, 7 of the remaining 11 responded “yes” to the question: Did the lack of communication in native language(s) limit people's participation in the international educational activities (for example IPY)? Three of the respondents who answered “no” to this question went on to state that people they knew in their country had not participated in any international activities. The survey respondents’ comments revealed that they felt this lack of international participation was due, at least in part, to language. For example:

> I never can use directly what I get in the workshops, I have to adapt, translate, look for German tools (often without success).
>
> I don't know (m)any French schools that participated in the International Polar Week. I'm pretty sure some would have if activities were proposed in French.
>
> I'm always struggling with language barrier. I would love to be helped...

These comments reinforced my initial perceptions that language issues had indeed impacted the functioning of the IPY EOC program and that the questions I had been asking in my interviews were important and appropriate.

Data Collection

As mentioned previously, my initial research focus was to get the perspectives of educators, communicators and scientists who had worked on a specific international environmental program. I started by collecting data through semi-structured Skype, telephone or face-to-face interviews with key IPY EOC committee and working group people about their experiences during IPY, using a combination of purposeful and theoretical sampling strategies (Bernard & Ryan, 2012; Morse, 2007). The participants in the initial interviews were 18 people (including both non-native English and native English speakers) from 16 different countries with whom I had worked over a four-year period. I deliberately excluded any official committee members who had not participated actively during their time on the committee. During the initial interviews, I used a snowball sampling technique (Arber, 2001) to identify other people who were also involved in international EOC projects during IPY for subsequent interviews. As recommended by Fredriksson et al. (2006), I used an interview guide with both standardised and tailored questions so that I could adapt the interview to fit the specific background and experience of each respondent. For example, questions about how and why the respondent learned English were not appropriate for those who were native English speakers.

Interviews were undertaken with committee members and with active volunteer members of the various working groups. I have not separated these two categories in the analysis for two reasons: confidentiality – the names and nationalities of the EOC committee members are all a matter of public record – and in keeping with the whole nature of IPY EOC – that it was inclusive in nature and not based on any kind of hierarchy.

Initial interview questions centred on two aspects of the IPY EOC program: interactions related to language and culture during committee and working group meetings, and the respondents' perceptions about reasons for success (or lack of success) in international education and outreach programs that were conducted over a two-year period. Interviewees were also asked for their opinions on the positives and negatives of using English as the main international language to communicate on issues such as climate change, and for their suggestions about effective ways to communicate about these issues across cultural and linguistic boundaries.

I ended each interview by asking, "Is there anything else you think I should have asked, or any important ideas I have missed?" This was especially valuable in the initial interviews with the EOC committee members and helped me reflect on my questions and refine them for subsequent interviews as new areas of interest emerged. It also allowed me to target new respondents who might be able to help expand on emerging ideas. A list of starting interview questions is included as Appendix 3.

Findings from the Research Questions

In this section, I return to my initial broad research questions (RQs) and discuss the perspectives of the initial group of IPY interview respondents as they spoke about their experiences and the knowledge they gained from their participation in the various IPY EOC projects and activities described above. Findings from the interview questions that related to more general issues of international communication and collaboration are discussed in greater detail in Chapter 6.

RQ1: In the perspectives of members of the international EOC community, did the use of English affect their participation in meetings and events and, if so, in what

ways? Overall, respondents expressed positive opinions about their involvement in the international IPY activities in which they participated and felt that, on the whole, the committee and working groups functioned effectively. Some words that were used to describe their IPY EOC interactions were respect, liking, inclusivity, trust, and openness. As one respondent said, "They [the IPO staff] were really open to all kinds of suggestions. And it created loyalty because of their openness and willing to go with people's suggestions."

Three of the 18 initial respondents felt that language was not a major issue with the IPY EOC committee or working group meetings because of the amount of international experience and the level of English fluency of the participants, but they commented that it could easily be an issue with similar groups of less experienced people. In the words of one respondent:

> I think in the committee meeting that is not a big problem because everybody were strong people with strong wills and therefore, they had their ways to dominate. They were experienced people working internationally, all of them, as I recall. … I think the thing is you have to have, in Norwegian, "elbows" enough to get to that kind of role, which means that they weren't afraid. So I don't think that's a problem in the committee, basically, but in similar settings it can sometimes be. *(NNES respondent)*

Four of the non-native English speakers acknowledged that language had impacted their participation, largely because of their own lack of confidence in their language abilities, especially during the first few meetings. One respondent admitted:

> To tell the truth, I think I didn't feel confident enough to, well, I mean, I used to give my opinion but I would mostly listen to what people had to say, especially

> because I was really afraid of saying something wrong or not making myself understood and I think it did affect me, yeah. *(NNES respondent)*

These language limitations were felt most strongly when people were tired or when we were dealing with complex issues:

> And in the end, we had a session about the future of the EOC thing and I had to facilitate that. And I remember that as being where I couldn't really get it, and I think it was just because of the complexity of the situation and then my, maybe being tired and something like that. So, then, to facilitate such a thing in a foreign language, it was <u>really</u> difficult for me, that situation. *(NNES respondent)*

The responses to my query, "Did the native English speakers dominate the discussions or have greater influence in setting the directions of the meetings and activities?" were particularly interesting. Ten people responded with an immediate unequivocal "yes." Several others, who were either native English speakers or were very fluent in English, admitted that they had never really thought about it but, after reflection, they agreed that this was probably the case. Two initially replied in the negative, but then went on to cite examples of cases where they had noticed the native English speakers taking control. Only one respondent, who was very fluent in English, gave a definitive "no" to the question when talking about the working groups:

> We had participants from Brazil and from Norway, from Denmark, from Greenland, and as far as I'm, sort of my idea of this is that we all more or less participated on the same kind of level. There was, of course, the director of the conversation … who would have sort of an understanding of where the conversation was going and they would sort of take the lead. But basically, my perception of this was that we all had the same sort of influence on how the talk was going. *(NNES respondent)*

Among the respondents who felt that the native English speakers had greater influence, there was no consensus about why this was so. In addition to language abilities, the reasons suggested by the committee and working group members included: individual personalities, participation styles, the percentage of native speakers, the IPO staff, meeting pace, and the need for non-native speakers to "prove" themselves first. These are discussed below.

Individual personalities. Four respondents commented that the level of participation in the committee and working groups, and their influence on the decision-making process, were strongly affected by individual personalities as well as by language abilities. People with strong personalities who really wanted to be involved were willing and able to handle any issues they may have had with language:

> I thought that it was the personality of the people who were there. I think if there were people who were a little bit more timid, that they might have had a harder time. But I think, what I'm thinking was with the group … they were there in the first place because they were interested. And they are the ones who are movers and shakers. Otherwise they wouldn't be there. And so, I feel like even though they may not speak English as well, they would, you know, they would say, "I have something to say and it might take me time." *(NNES respondent)*

Another NNES respondent felt that personalities and English language abilities may have been related, and that people who were fluent in English were more likely to come across as being dominant in the meetings:

> I could see that a lot of the dominant personalities at these meetings were either native English speakers or people who were very fluent. And a lot of the international folks that were leaders during that time were very fluent in English. *(NNES respondent)*

Participation styles. In some cases, personality differences were felt to be related to cultural differences that influenced people's modes of participation:

> It's also a bit of the cultural background because in Europe I think we're more in first getting acquainted with each other's opinions and in the … United States of America, it's just more kind of putting straightforward an opinion and see if other people disagree. And I think that's the primary cultural difference between participating in an international arena where not everyone agrees with each other. If everyone agrees, that's fine. You know, it doesn't matter. It's fine if somebody takes the lead, that's fine and it's just, uh, there's no personal confrontation. But if you disagree, and you have an own opinion, I think then, there the way of concluding things is different in Europe than it is in the States. *(NNES respondent)*

Two respondents (one NES and one NNES) also commented that group participation styles in some English-speaking countries tended to be more direct, so those people were more likely to take charge of the proceedings. This was due, in part, to the fact that it is easier for native speakers to dominate a meeting because of their greater command of the language being used, but also because the United States in particular was seen as having a very dominant culture overall:

> Obviously there's a difference of strengths of personality as well, but it's easier to speak louder if you're speaking in English and English is your native language. … So I do think the English speakers dominated, but maybe culturally also, like the American culture for instance is actually quite a dominating culture. So it would be difficult to differentiate between language and culture there. *(NNES respondent)*

Percentage of native English speakers. There were a higher percentage of native English speakers (from the UK, Canada, the US, and Australia) involved in both the

committee and the working groups. This still leaves the question of whether this was a cause or an effect of the fact that the meetings were all held in English. It was suggested by several respondents that if you didn't speak a reasonable level of English, you would not have been asked to become a member of the committee despite your expertise in polar education or communication, even if you worked for an important polar research agency or organisation. One respondent gave an example from her country illustrating that the original choice of EOC committee members was driven in part by language:

> I think language did play a role actually. I know it played a role in this instance because the head of education and outreach at the time [at the country's main polar research organisation] ... didn't speak English. So doubtless, he should have been on the EOC committee, but he didn't speak English. So yes, I would say that had a direct effect on that. *(NNES respondent)*

This suggests that, by regulating the choice of members, the impact of language went even deeper than the way in which it affected the functioning of the committee and working groups. This was clearly not an isolated case and echoed similar findings from studies in international business. For example, Janssens et al. (2004) noted that "the language strategy in an international company is a way to decide which languages can be spoken and therefore, which groups and/or individuals will be involved in the international communication process and impact its outcomes" (p. 242). In their study of multinational corporations in Berlin, Erling and Walton (2007) found similar results and wrote that, "These findings show that the process of weeding out people without English skills is done in the hiring process, as applicants with little or no English skills are not even considered for positions" (p. 39).

Similar findings have come from studies of scientific journals. Ammon (2006) pointed out that journals need to be referenced to be included in the Citation Indexes, and

that the referencing and author correspondence is almost always done in English. Therefore, as he emphasised, English-speaking skills are necessary for a person to be considered for a position on the editorial board: "English is the only common linguistic denominator of the editorial board and members are chosen so that this common denominator is guaranteed. Scientists who refuse to learn or to use English exclude themselves from board membership" (p. 9).

IPO staff. All three of the paid staff in the IPO were native English speakers. Interview respondents felt that these three people had a greater influence, less because of language, but because they were working on the project full-time, while all other participants were involved on a volunteer basis. It was also felt that the IPO staff had a greater degree of power because they controlled the funding that went into the various projects and activities.

Meeting pace. Seven respondents emphasised that the pace of the meetings also favoured English speakers. This was especially true when people got excited by ideas and several people started speaking at once, as well as during the telephone conference calls. One NES respondent reflected on this, admitting that the meeting facilitators did not always realise that others were having trouble understanding or keeping up with the pace of the meeting:

> I believe there was a tendency among the English speakers … to sort of race ahead. Uhm, to not slow down and look around the table and confirm everybody's engagement. I believe that happened especially often on the phone conversations. … I think it was possible that we finished many of those calls thinking from the centre that everyone had heard the ideas and agreed the actions, when … key members of the committee weren't keeping up. And that's no way a criticism of any member of the committee. It's the fact that we raced ahead in English and

> didn't take, often didn't remember to take the steps to say, "Any questions?" You know, question everyone on the phone to make sure everyone heard. … I think it happened more often than not. *(NES respondent)*

One respondent pointed out another issue of pace, saying that because it may take a non-native speaker a bit longer to respond to a question or comment on an issue, native speakers often bring up the same points before others have completely framed how to say something, which might contribute to a perception that the native speakers were dominating the proceedings:

> I remember once sitting at a table and something official, and I perfectly knew what to say, but there was a kind of hesitation. But there were enough people who were able to express the same thoughts, and I'm not the first one to do that, you know, because it's always kind of, yeah, looking for words and trying to have the right words on the right place and the right location, you know, that kind of stuff. *(NNES respondent)*

Another NNES respondent expressed a similar idea, noting that non-native speakers had to work much harder to keep up with the pace of the meetings, and that they constantly need to work on maintaining or upgrading their English skills if they want to participate actively in international meetings:

> I have to acknowledge that by coming from an English-speaking country makes things much, much easier … Because everything is in your native language. You know, it's much easier. We have to work, I wouldn't say twice as hard, but … if you're not used to it, it takes longer to get into that rhythm. You know you have to upgrade if you are not used to going to these international meetings, and you're not used to English language or talking it very fluently, it's something that is a barrier. *(NNES respondent)*

The issue of the meeting pace was seen by most respondents as inevitable due to time limitations. All of the committee and working group members were volunteers. For some who were employed by polar research agencies or organisations, the time spent on IPY work could be considered a part of their normal work hours. For others, however, it had to be fit in around their regular jobs. The few face-to-face meetings generally were scheduled for a three-day period; however, many people had to fly in from long distances, which could add from two to four extra days to a meeting. This caused several issues, as seen by comments from these respondents:

> Sometimes there is also a time constraint, people don't wait until that moment; they just go on. They start with the workshops, the organising things, so as non-native you have to adapt to that. *(NNES respondent)*

> There are periods when you are doing something at a certain pace and what I mean by that is either you're under a tight deadline or people have to go, and so the speed of that conversation can get quicker. *(NES respondent)*

Time constraints were even more problematic during the telephone conference calls than they were during face-to-face meetings. Most of the calls included people from the Americas, Europe, and Australasia so, in addition to the burden of functioning in another language, there was the added difficulty of time zones. It is especially hard to focus in a foreign language when it is midnight or 5:00 a.m., as noted by one NNES respondent who commented that "everybody was all over the globe, and your ability, even your ability to think in a different language mattered what time of the day it was."

People often had very limited time for these calls because of work or family obligations so the length of the calls was strictly limited, generally to one hour. This made it more difficult to allow for in-depth discussions or for constant monitoring to see if everyone had understood or agreed with the decisions that were made. Four NNES

respondents commented that they felt this restricted their level of participation. In the words of one:

> The conference calls were very difficult for me. It goes very quick. It has been USA people, Australian people, Canadian, and the English goes very fast and as non-native speaker, you can address that once but you cannot repeat that you cannot follow all the time. So, which means that you cannot participate as active as if it were your own language. *(NNES respondent)*

"Burden of proof." Three NNES respondents also felt that non-native speakers had to "prove" themselves first before their ideas and input were taken seriously, or that their own self-perceived lack of language fluency affected the level of importance accorded to their ideas. According to one:

> Once you are known, once you have been expressing yourself, once they know what you do, you have more inputs. So, first you have to defend yourself in such meetings. Whereas I think, if you have your own languages, it's more natural. It's just, they just listen to you. *(NNES respondent)*

Another NNES respondent mentioned that there is always a danger of language being used as a power tool in international work, and that a non-native speaker may feel insecure because he or she is not sure of understanding the nuances of the language. He stressed emphatically, however, that this had not been his experience in the IPY EOC context because of the level of trust that was developed among the people involved:

> There's always a problem being a non-native English speaker to realise when a native English speaker apply the language to somehow manage a situation through the way they speak, use language as a power tool. As a foreigner you are always insecure about that. You cannot know for sure whether what you now heard was meant as a joke, meant as a way to control the situation or you, put you aside or

> take control or those things. The nuances in English is always a challenge for a person that is not native. When you learn to know people and therefore trust them, then that is not really a problem, but it is always a challenge when you go into a new setting with new people. *(NNES respondent)*

There was a general level of pragmatism expressed in relation to all of the issues just discussed. All of the respondents agreed that English was the only practical language to use in the majority of IPY EOC meetings and telephone conferences, and that inevitably meant that some people would be disadvantaged. One NNES respondent summed it up philosophically:

> If you take part in an international project you should be prepared to accept this. ... If you don't agree, you don't want any kind of influences related to the differences of languages, you should not accept to take part in an international project. This is my idea. And you should be ready to accept that your idea and what you are saying could be evaluated as less important. *(NNES respondent)*

RQ2: How did this affect our decisions about what international activities to undertake? The activities that were chosen may have been affected in two different ways. One of those goes back to the dominance of certain people who had key roles on the committee or in the working groups. In the words of one respondent:

> I think that some of the dominant personalities, and maybe it was language, I'm not sure, led to certain activities or certain thinking being one nation versus another. You know, like a US-dominated look at higher education or something, versus what it might be like in Russia. *(NES respondent)*

The other factor that affected the selection of activities was probably due more to access to resources and programs than it was to language. The EOC committee chose the basic theme for each of the Polar Days after discussing the options during both face-to-

face and telephone meetings. However, the specific international activities such as webinars, interactive radio programs, and video conferences were determined primarily by the partnerships that the IPO staff could form with organisations that were involved in polar research and education, and that also had the appropriate technology and other resources to host events of that nature. As a result, most of the interactive events on the Polar Days were hosted by organisations based in Canada or the US. In contrast to many other countries, Canada had a strong national IPY Secretariat and national funding for IPY activities, as well as an active history of research in the Arctic. The US has also had funding sources and active polar research organisations, both Arctic and Antarctic, for many years, which provided the resources to host education or outreach programs.

One NNES respondent expressed the opinion that, in addition to the ease of language, the high quality programs available in Canada and the US had an influence on the decisions made by the committee and working groups about what international activities to carry out:

> You have two things going on. One is the effect of the language; the other one is who's the best. And you have within our group, you know, you have people coming from Australia, UK, US, you know, typical English-speaking countries, that naturally they would be dominating the work that is being carried out in education and outreach. So that's a normal process. … They are not good because of the English language, it's because they had very good programs. *(NNES respondent)*

RQ3: How did it influence people's decisions about whether or not to participate in the activities? The EOC committee and working groups did not include many people from Asia, Africa, or South America, which respondents felt was probably due in large part to language difficulties:

> The time that we had the Chinese representatives at one of the EOC meetings, I think that they had the hardest time and I could see that it was a struggle for them. … I think it affected our ability to be able to get some of the Asian countries involved and some of the, you know, South American countries. I think it was much more difficult in those places. … We saw that a lot with the balloon launch and I think it was probably a lot to do with language. *(NES respondent)*

This lack of representation at the committee and working group levels also impacted the number of people who participated in the international activities. For one thing, since most translations were done by volunteers, fewer materials were translated into languages specific to the regions that lacked representation. Secondly, the committee and working group members were the main drivers for getting information about the different projects and activities out to other people in their home countries. Without representation at that level, there was not an effective delivery mechanism for the materials that were available.

It was also noted by respondents that people who were not comfortable speaking English did not choose to participate in the working groups. The working groups functioned primarily through telephone conference calls. As noted earlier, this type of interaction is more difficult for non-native speakers, as well as for native speakers, than face-to-face meetings, in part because of the lack of visual cues that can help people assess the level of other participants' understanding:

> I think if you can see someone's face then you can see if they're struggling, because a lot of people show emotion in their face, like if they don't quite agree or if they don't understand, you can, more times than not, you'll see some kind of reaction in their face. So if you can see that, then it makes you more sensitive to

> the fact that perhaps we need to reword or maybe we need to readdress that issue for the person. *(NES respondent)*

Without the visual cues, you often get several people speaking at the same time, which makes it even more difficult to follow a conversation, as noted by another respondent:

> Using those types of technologies, lots of times on the phone, people's voices get overlaid on each other. And as a non-native speaker of French, I know how difficult it is to follow one person's conversation, so if I have two that are overlapping on each other I imagine that can be very difficult. *(NES respondent)*

There was also agreement that teachers who were not comfortable in English were not greatly involved in the education activities at the international level. Teachers in some countries, for example, did not want to participate in the international school activities that were held every three months because of the language issues. One teacher said:

> I invited some of my colleagues to join the activities and many of them were not really interested because the activities were in English. So I promised them I would translate everything and so, for those to whom I translated the materials … they were interested, they were willing to participate. But those who didn't speak English and, when there were students from other countries involved, speaking English always, none of my colleagues would take part because there was this language problem. Right, so they were not interested at all. Well, I mean they might have been interested, but the fact that everything was done in English, that limited their participation. *(NNES respondent)*

She went on to comment on the difficulties she encountered when she involved her students in the live webinars or video conferences on the Polar Days:

> For instance, when we were talking to the people in Canada during that radio show, I'd have to explain as people were talking about polar issues. I would have

> to explain at the same time what was going on, what they [students or researchers from other countries] were saying, and ask them [her students] if they had any questions, and then ask the questions in English, because otherwise they wouldn't have any opportunity to take part because they didn't understand anything or they understood very, very little. *(NNES respondent)*

One NNES respondent spoke about the international polar teachers' workshop in Oslo, noting that more teachers from her country would have been interested if the original invitation had been in their native language, even though the conference itself would be in English. This is because reading in a foreign language is too difficult and time-consuming:

> If we sent the original invitation in French or in Dutch, they will start to read it. And even though they know that the conference is in English and the polar teacher educators' workshop is in English, they will come. If they are interested in the polar sciences, they certainly will. But it's the first, the first step towards. So, if it starts, for them in their daily life, it's too difficult to read everything in English. *(NNES respondent)*

One issue we noticed quite early in the process was that people who could not read English, or lacked the time or incentive to do so, made limited use of web-based materials prepared by the international groups, in part because of the sheer quantity of material available online. An NNES respondent explained her perspective:

> The computer environment brings everything very close and access is very easy, which means that there is so much information. … In your own language, you read, how do you say it, diagonally. You don't read every sentence. You go through, visually you go through documents. If you have another language you

> read row per row, line per line, and which means that it takes you ages. *(NNES respondent)*

Even if an activity was provided on the IPY website in other languages, it didn't help much if the directions on how to find or complete the activity were only provided in English. One NES respondent commented on how the IPO staff tried to address this, with partial success, by adding multi-language directions:

> What we recognised very quickly [was] that putting material on line, which was our distribution mechanism, or an e-mail, in a given language, whatever the language, was only a partial step, however. So if we didn't also have instructions – we learned this very clearly with the Tagzania, the digital balloon launches – we said, "Oh, look. Here's this wonderful array of materials in 20 languages and all you have to do is log in and launch a balloon." But the log-in and launch-a-balloon instructions were all in English. And so it was translating the access points, as well as the final content. *(NES respondent)*

Teachers, in particular, need materials in their own languages to use in the classroom. They don't have the time, or in many cases the language skills, to search for and review materials in other languages. Several respondents said that teachers in their countries would never use English-language materials, even though it is allowed or even encouraged in their school systems:

> Although it is encouraged here to have transversal education, which means that they can use … for example, in a class physics that they use in English physical experiments or English written material, that they should use it. But this is far off from reality. The teachers are far too short in time for these things. And the curriculum is too full for this so that they can afford, which means that they are always searching for their own language materials. *(NNES respondent)*

Just translating materials was not enough, however. People also had to be interested in the subject and know that the materials were available. Many of the interview respondents felt that this relied primarily on the active promotion of the materials in different countries by committee and working group members. One respondent pointed out: "Maybe it's not the materials but the, if there's people who are active in the place to try and get them used." Another one commented: "It's great to get a flyer in an e-mail that says, 'Hey, do this in your classroom,' but if they didn't feel connected from the beginning, they might not have picked that up." A third expressed her opinion that: "You will reach the people who were involved during IPY but you will never have another community of teachers going to that [the IPY website]." In addition, they recognised that participation in the IPY activities and the use of the materials could not be imposed by outside groups or countries. As one NES respondent said: "It's got to be driven by the demand. I mean there's no point, the NSF [National Science Foundation] decides it's going to translate stuff in Chinese and, you know it's got to come from the Chinese saying, 'We'd like to use your stuff.'"

The use of volunteers was seen as a crucial factor in both translating the materials and getting them distributed and used because it built up a wider network of interested and engaged people:

> The translations are critical because, firstly, they helped people from non-English speaking countries feel that they were being included and so forth. … I'm pretty confident that we would not have had the kind of international participation without those translations. But also because the people who did the translations then were also central to propagating that material around their own networks. … It's just the fact that you put effort in creating the material and you also want to see it getting used. *(NES respondent)*

The availability of translated materials was not the only issue. Differences in school systems and national curricula also had an impact that limited the use of the materials significantly. As one European respondent put it:

> School systems are different in every country in the way to prioritise and accept something to be used in schools is very national systems. I think, in real life, all that was produced [by IPY EOC] ended up being relevant only for some few countries. … It was very, very rare and specific cases where they were actually used in non-Anglophone countries. And I think the problem is not necessarily the language; it might be on the assumption that education systems are the same all over. So it's not necessarily a language problem, but that add to it. *(NNES respondent)*

This sentiment was echoed by another European respondent who said that the Polar Days had not been very successful in his country because of lack of necessary advance planning and scheduling time:

> The educational system in my country is very much in a kind of very regulated program, so it's not a matter of teachers are not happy to use those things or are not willing to participate in international Polar Day or something like that. They won't have the time to do that because they really have to stick to a very tight time schedule where for every hour, every day, they already know what to do because, at the end of the year, they have to defend their program. One of the lessons I've learned is, well, if we would really try to fit in Polar Days in our educational system in particular, or extra activities or something like that, we have to plan that at least four years beforehand. *(NNES respondent)*

The same issues apparently applied in Greenland, although lack of translations into Greenlandic also played a significant part:

> I have been working with Education Greenland for 9-1/2 years now and my experience tells me that … for many teachers to divert from their yearly plan to do something else, perhaps even more interesting, is very hard for them. Sort of they're very hung up on "Now we have made a plan for August, so this is what we are going to do in August," even though something different and even more exciting may come up. Yeah, and that is a problem in Greenland, not just on IPY issues but on sort of any issues. *(NNES respondent)*

In addition to issues of language abilities, translations, and national school systems, other political and cultural factors may have influenced the participation of people in some countries:

> IPY was a bottom up initiative, which is Western thinking, I think. Some of these countries where science is still done as a top down initiative, I mean you get your directive from your boss who gets it from their boss. I think that might have influenced how things were done. If we would've had support from high-level folks, we might have been able to get more EOC activities going. *(NES respondent)*

RQ4: What lessons can we learn from the experience to improve this type of international collaboration in the future? The personal connections and the friendships that were established and built up through the IPY EOC experience were seen as an essential part of the success of the program. For the official committee members, as well as some of the working group members, the opportunity to attend some face-to-face meetings was extremely important in terms of establishing the initial contact and maintaining the momentum over time:

> If you talk to someone over the phone whom you've never met, I think it's very difficult to actually get an idea of who they are, where they're coming from. I

> think if you've met someone face-to-face and you've had that initial contact, I think it just makes further communication so much easier. *(NES respondent)*

The face-to-face meetings also made communication easier, especially for those who were less confident about their English abilities, due to the fact that non-verbal cues are not available through most modern technologies, or through written communication:

> Face-to-face meetings is different because there you, people see that you want to talk. You have the non-verbal communication. People see that you have something to say. On the computer you don't have it. On a telephone call you don't have it. And also written language, there is constraint. You won't give all your comments if you won't write these in the same way as if it were your own language. *(NNES respondent)*

Unfortunately, face-to-face meetings are not always practical in international collaborative work, and collaboration often needs to be carried out using distance technologies. The respondents had a number of general suggestions for ways to improve communication, whether face-to-face or by other means. These included respect, openness to difference, and constant awareness and reflection. These ideas are discussed below.

Respect and openness to difference. One of the key characteristics for successful collaboration mentioned by the respondents was the ability and the willingness to accept and embrace differences of culture and language, and to understand that there is more than one way of knowing and thinking:

> An openness to understanding that people are different and it is OK. … I think sometimes we get entrenched in our own ways of knowing and doing, that we forget that there are many different world perspectives and different cultures. *(NNES respondent)*

This type of understanding was seen as a basic form of respect for others that needs to be given a tangible form, rather than just acknowledged:

> I think that fundamental aspect of respect, and I think that translates into, you know, that things move beyond just tokenism. … And I think we need to make sure that we move beyond that we're just being polite. And respect in trying to convey things beyond English, trying to engage people at a different level, instead of just understanding the concept, but owning the concept. *(NES respondent)*

One respondent gave an example of a possible way to incorporate a greater cultural sensitivity into international programs and materials. He suggested an interdisciplinary approach that involves cooperation among natural scientists, social scientists, and teachers:

> If we have materials it'd be really nice to translate into different languages, that we would have a group of experts, that we would have scientists and teachers very sensitive that would not only be able to translate it, but also have social scientists who understand, to have that broadened view so that those activities won't clash with their cultural, local cultures. *(NNES respondent)*

Another respondent drew on his international experience in the Arctic to suggest a way that international science conferences could show increased cultural respect, even if the conference or meeting would be held in English:

> I travelled widely throughout the North. North Russia, northern Canada, Greenland. In that case, you're a western and southern visitor coming into a northern community. And, eventually, in all cases, the meeting … would eventually go to English, partly because that was the language that was shared among the cultural groups. … In those meetings, in order to send the message that you, the visitor, have arrived in our, the hosts', home, they would almost always

> do some sort of opening ceremony. A little vegetation and ceremonial burning and smoke ceremony. … It starts your meeting off with the recognition that you're in a different place with different traditions. … I think that's a tradition that science could learn from … it gives you a little pause to say, "Ah. We're in Inuit country … and there are other traditions and other languages around us." *(NES respondent)*

Awareness and reflection. Many of the leaders of international environmental education and outreach initiatives are native English speakers or have a science background that requires them to work primarily in English, and they are often unaware of the difficulties faced by others. In IPY EOC, the use of English and inattentiveness to the potential issues this might cause was not a deliberate power play; rather it was based in the way many of us had been conditioned through our education and working environments, as well as our lack of reflection about it. One NES respondent commented about international APECS meetings:

> It's not something that we've ever discouraged [using languages other than English], it's just not something that was ever brought to the forefront, I think. Because we normally think of … English being the dominant language for science, I think. *(NES respondent)*

In general, the native English speakers also had the perception that the others were all very fluent and comfortable with using English. This may also have influenced the pace of the meetings and the lack of reflection about potential issues related to language:

> I think, as I said, that all the committee and working group members were actually incredible; they just didn't seem to be nervous about using English at all. I mean, I guess that's why we just sort of roller-coasted on in English and never gave that side a second thought. *(NES respondent)*

In response to a question about whether or not the native English speakers had a tendency to dominate the IPY EOC meetings, one NES respondent commented that the question had increased her own awareness of the potential problems for others:

> You know I hadn't thought about it. My first reaction is probably yes because, you know, we think in that language, you know we move forward in that language whereas people that don't use English as much were probably processing things slower and the meetings moved pretty fast. So I can imagine myself in that position sitting and listening more than taking a lead in the direction of the meeting. That I would be struggling just to keep up with what was happening rather than taking a lead, so my gut reaction is yeah, that we probably did, not intentionally or anything like that but I think, you know, because all the meetings were in English, and all the science conferences were in English, so I think that the planning of them probably put people with other languages at a disadvantage. *(NES respondent)*

Others were aware of the potential difficulties, but admitted that it is often difficult to maintain this awareness over an extended period of time. One NNES respondent observed this in the IPY meetings and commented:

> For example, if you come from an English-speaking country and you come across somebody from a different country that doesn't speak English, in five minutes it's very easy for people to forget that it's not their first language and sometimes it takes some time for people to catch up. *(NNES respondent)*

This is not just an issue for native English speakers. Another NNES respondent pointed out that he has similar problems when people from other countries visit him:

> This is not due to the fact that you are native English, this is completely human. Even when I have a guest in my home that is not very fluent in Italian, I, after

> some days or even after some hours, I used to behave as if they understood perfect Italian, but this is not true. *(NNES respondent)*

Even native English speakers commented that they had learned more about their own language through the process because of the different types of English that were used as a result of the international composition of the EOC community. This also made them more aware of the difficulties that a non-native speaker might face:

> I, as a native English speaker, learned lots of idioms and nuances of the English languages that came from Australia and the UK and, you know, you learn a whole different aspect to your own language. Which matters. 'Cause I didn't use "fortnight" very much before I hung out with P, or K. [laughs] What is a fortnight? What is that? So you learn nuances within your own language which make you feel a little stupid. I mean, I'm a native English speaker, but I certainly didn't raise my voice during a meeting and say "Excuse me, could you tell me how long that would be?" So imagine all those nuances of the English language that vary across countries, and then put yourself in L's shoes or B's shoes, you know. *(NES respondent)*

Another NES respondent reflected on the importance of native English speakers having some experience with learning and speaking another language. She commented on her second language experience and how it had helped her be more sensitive to the potential problems faced by others:

> I feel that it's actually very important that I did speak a second language. I thought it was very helpful that you spoke a second language. Not because we used it very much, but we had an understanding of how it feels to speak a second language. And I know from when I was learning German and living in Germany, I used to get really tired, <u>really</u> tired at the end of a day of speaking a second language … I

> think the meetings were really hard work, even for people who had a high level of English. And the social events, they were often just exhausted by the time it came around to the evenings because they were having to think and communicate in their second language and we really noticed that. *(NES respondent)*

In summary, respect, openness, awareness and reflection were seen as critical steps towards improvement of international EOC programs. However, these ideals have to be translated into action to be effective agents of change. Interview respondents had several practical suggestions in this regard, which are described below.

Facilitator training. Five respondents commented on the role of the facilitator(s) as a very important factor in the success of international meetings being conducted in English. They felt it was much easier for non-native speakers to follow the discussion and contribute ideas when the meetings were well structured, and when the facilitator asked periodic clarifying questions such as, "Is everything clear?" "Did you understand?" "Should we have a short break to summarise?" One NNES respondent commented that her experience in Europe had shown her that meetings conducted in English could be very effective because they allow for direct communication between people, but that many times facilitators lack the necessary training to do it well:

> In Europe we have with this, all these countries and different languages, we try to deal with this with a lot of translation and things like that, but if you have these things translated … sometimes it is not possible to have this direct contact to people. And so, then Europeans, French, and German peoples begin to talk English because it is what both of them know, and they aren't perfect but they can talk directly. If the other one cannot speak German and the other one cannot speak French well enough, then we meet in English. And I think it's good that it is possible to do that, but it just needs a lot of training. *(NNES respondent)*

Pace and wait time. Several respondents suggested that periodic short breaks during meetings would give people an opportunity to think about the topics under discussion and to formulate any questions, suggestions, or contributions they might have. In addition, they suggested that pauses after questions were important to give people a chance to process the information:

> The wait time is important. The same way we say that in a classroom, when you ask a question, don't give the answer right away because nobody said anything. Because sometimes the kids are afraid, and sometimes they're thinking. So you need to give them time. And so, I think it is with adults too. *(NNES respondent)*

Wait time may also be important to allow for cultural differences in the way people may respond in a group situation. It can also allow others time to work out the meaning of non-verbal cues such as body language:

> We need to realise that there are other ways of doing things. Than our own ways. And, learning that, you know, maybe I'm speaking too fast. Maybe I have to slow down. Maybe I'm not waiting long enough for them to respond, and also not getting the body cues that they're giving me. Because they are different. *(NES respondent)*

Bilingual work. Everyone agreed that English was the logical language for much international collaborative work, but there was also a consensus that there is an important place for bilingual or multilingual approaches. Working with new computer technologies in English, for example, often places an extra burden on non-native speakers, as described by an APECS respondent:

> APECS concentrates on training young researchers, but we train them in English to do things like, for example, participate in a webinar. Right, I mean there's a lot of senior researchers who haven't done that. So if we're trying to get the young

> researchers to do that and to do this new technology thing, and do it in a new language, that's two extra challenges, I think. *(NES respondent)*

She suggested using an approach where the training is conducted in native languages before participants start using the technology to have conversations and give presentations in English. She also gave examples of APECS webinar presentations where the presenter spoke in his or her native language, and a colleague then translated it into English.

Even respondents who felt that it was important for people to learn English recognised that this is not always possible. Having materials and presentations translated was seen as important in building links to local communities:

> Keep collaborating to try to … translate some of the amazing material that is out there in different languages. Because I think, you know, it's important that we learn English, but not everybody can learn English. That's just the reality. So I think we have to bring some of the knowledge that is out there back to the communities. *(NNES respondent)*

Volunteer translations. Several people mentioned the fact that having volunteers translate IPY EOC materials into their native languages was one of the most positive features of the program. It engaged the volunteers, gave them a sense of ownership, and added to the collaborative spirit that kept many people involved over a span of three or four years:

> If we think of IPY and all of just those Polar Day fliers that were translated, people were doing it out of the goodness of their hearts; those people who were doing the translations were engaged. They had an ownership over this process and a connection to it that drove them to it. I mean all of us, that drove us to work at 3:00 a.m. or 4:00 a.m. or wherever we were and, you know, to keep pushing,

> right? I mean a lot of people gave a lot of themselves above and beyond a 9:00 to 5:00, you know, because of the nature of the program and the spirit of the program, and I think that really made the difference. *(NES respondent)*

Working with schools and children. At the school level, a lack of appropriate materials about IPY and polar research were cited by several respondents as a limiting factor. We translated the international activity fliers wherever possible, based on available volunteers. There was still a need, however, to have additional age-appropriate materials and activities in native languages. One NNES respondent went on to say:

> For instance the fact that in Italia, in Italy, there was no official group following the IPY and everything was made on a voluntary basis, limited a lot the quantity of materials in Italian and this affected the potential, the potentiality of the project in Italy. For sure. Yeah. I'm sure about this. *(NNES respondent)*

He also spoke about his experience with connecting groups of students in Italy with students in other countries through the international Antarctic Geologic Drilling program (ANDRILL), pointing out that although language could be a barrier, it was not always the major issue because generally the students and teachers were willing to work together to reach an understanding. In his opinion, both a lack of written materials in Italian and a lack of English-language materials that were age-appropriate and relevant to the subject under study were greater obstacles:

> As you probably already know, in a normal classroom there are every day new challenges to face. And the challenge of language could be another one, and at some times it could be the toughest one. But in my experience, I've seen that students, they react in a very positive way and especially teachers. One of the huge drawbacks of the project is due to the fact that these projects, they are not supported with materials. This is a really big issue. A big problem for teachers

> because, of course, obviously in Italy we find tons of English pages, but the problem is to find that material in English suitable for the project, that is not the exactly the same as that taken for English language theory. *(NNES respondent)*

In some cases, even if the international projects didn't have much impact in a given country, IPY EOC initiatives did succeed in "setting the stage" for future education programs and projects in the schools:

> It really worked very well in showing the opportunity in teacher conferences and that kind of thing. So, it's really getting its effect, starting now. Three years later. … There's now more acceptance of the subject into the regular school systems and even from the informal educational point of view, there are a lot of initiatives still in the Netherlands that relate to the IPY period in museums and books. *(NNES respondent)*

> It was an incredible opportunity for Italian schools to take part in this project in any way. And I am sure that these, the IPY, had a huge effect on the everyday activity of school and is still having this impact even now that IPY is finished. And I had some signal of this kind. *(NNES respondent)*

A bilingual teacher respondent from the United States commented that the opportunity to attend the international teachers' conference in Oslo is what gave her the confidence to use the materials in the Polar Resource Book with her students. She was also able to adapt the materials to fit into both the US and the Mexican school systems, since she collaborates with a school in her original home town in Mexico:

> Some of what I learned two years ago when we went in the teachers' program in Oslo? All the materials that I learned over there, the activities and that, is what I have been using in the school that I used to work, and with the Mexico, you know

> I'm working with the Mexico school now, all the same materials and the resource books. *(NNES respondent)*

She started incorporating IPY projects in her classes in 2007, and found that they provided a good platform to build relationships with the families of her Mexican immigrant students, noting that now "the parents are really less afraid to be involved and having their kids participate, you know, with the rest of the community."

She went on to say that the relationships she developed through the teacher workshop and the subsequent activities she has done with her students have changed the attitudes of both the children and their parents in her school in Texas, and have increased their curiosity and desire to become part of a larger international community:

> The children from Mexico and their families, because we work with them, I have been doing a little more work, I brought some of the working relationships that we had in Oslo with other countries. So they are really motivated about just getting to know people, or getting to know scientists or other teachers beyond United States. *(NNES respondent)*

Making it relevant. ICSU commissioned an assessment report after the EOC committee was disbanded in 2010 (Provencher et al., 2011). The international assessment committee was composed of a project coordinator from Canada and 14 members from 8 countries who had been involved in IPY EOC. This assessment included an inventory of recorded materials, reports, and archived web links, as well as an online survey. The survey was made available in English, Chinese, Russian, and Spanish, and was completed by 250 respondents.

It was clear from my IPY interview respondents, as well as from the ICSU assessment, that teachers and students wanted to participate actively in science, rather than just learn about it through books and classroom sessions. A teacher from North

America whose students had participated in some international interactions as part of IPY also noted that the opportunity to interact with people from other countries was an extremely important part of the learning experience because it helped increase the students' awareness of the world beyond their geographic borders:

> There was this amazing excitement when the kids were talking with students from another country who didn't speak English and, and, just that cultural connection was really exciting for the teachers and the students. So that was met with a lot of enthusiasm and I think that it opened the students' eyes to life in other places. *(NES respondent)*

In addition, the IPY EOC experience highlighted the need to frame communication so that it addressed the needs and concerns of specific audiences. For example, it was difficult to interest people from non-polar countries in polar research and show them how the polar regions were important to them. In general, the messages had to be framed within the bigger picture of global climate change in order to seem relevant to people in those countries. Of the EOC projects surveyed as part of the ICSU assessment, 68% indicated that climate change was a theme used in their outreach efforts (Provencher et al., 2011).

One IPY researcher from a non-polar country I interviewed spoke of his approach when working with non-scientists in his country:

> Within the global issues that were concerns in the polar regions, I could understand which of them were more attractive for the Portuguese people. And that, culturally, would be more interesting. I'm not saying that I would remove some of the issues – "Oh, sea level rise is not important" – it's not that. But I was very sensitive to the way I would portray sea level rising in the way that it would make sense locally. I'll give an example. For example, when we were talking

> about sea level rising, I would show examples of what is happening on erosion in the coastal areas of Portugal that are facing that problem. And then I would explain how if the Antarctic ice melted how the sea level would rise, how much ice Antarctica and Greenland holds, that might increase the sea level rising. So first … I would say that this is what is happening in Portugal. You know, this is what the problem locally makes a problem, and this is how the polar regions can affect it. *(NNES respondent)*

A youth environmental group in Malaysia and a class of Brazilian students participated in a live web conference during IPY, where the students had a chance to discuss climate change and the polar regions with each other. Before the conference, the Malaysian children watched some videos that were made by the International Polar Foundation. (The Malaysians had to get up at 3:00 a.m. because of the time zone difference and the adult facilitators decided this would be a good way to wake the children up, as well as get their focus on the issues to be discussed.) In discussing the event with me afterwards, a Malaysian facilitator said that it was the personal connection with people in other parts of the world that made the exchange effective:

> If you do everything out there and I do everything here and I read about the children in Alaska, but if you don't communicate with the children in Alaska, how would you know what their problems are, what they're learning in school? So that communication with Brazil was a fantastic thing that has happened to our kids, but it's only a small percentage. But I believe it's that small group of children have got a huge input into the problems around, around them, around globally – uh, huge. Just from that half hour of communication, it's an impact. And if they have a chance to do that again, that would be even better with that same group of people. But, I think little groups of people do it, but in the end you are going to get lots of

> kids being able to share problems around the world. You know what, Brazil and Malaysia; we're not even in the IPY countries, are we? You know we don't have ice melting in our mountains, or anywhere, so we don't know, but we are affected. That's the only way we understood, that we are affected. You know, how does it affect you? *(NNES respondent)*

The Brazilian teacher also participated with her students in the Polar Day that was focused on people living in the Arctic. A Canadian indigenous radio station hosted an interactive radio program with web-streaming for this Day. The teacher commented that it made a difference in her students' attitudes towards the polar regions in general, and their interest in the people who are living there:

> I think that hearing from people who live in the Arctic, I think made some difference. Yeah, because it was their point of view, the point of view from people who are living there and facing the problems they are facing. Yeah, I think that, it doesn't sound, how can I say that, too far away. They were talking to someone living there, so it was not just something they read in books, right, not just something they saw on TV. It was like interacting with people from that region that made them understand a little bit more and be more interested. *(NNES respondent)*

The same teacher felt that participation in the interactive IPY activities had not only helped to change her students' understanding and attitudes, but her own as well:

> I think IPY changed my values, my attitude, towards not only the polar regions because, you know, I had no attitudes at all [laughs] about the polar regions, but about the environment. I mean, I've always been concerned about the environment but I think that it made me even more aware, aware, if I can say that, more worried about global warming and climate change. As I said, it's different when you watch

> the news and they show something about the ice and about permafrost or, you know, that science on TV and then you get to talk to the people who are being affected by that kind of thing. I think that was a huge opportunity and I would never have had that opportunity if it were not for IPY. *(NNES respondent)*

Summary

In the case of IPY, the use of English was not a deliberately chosen strategy; rather it was a largely unconscious decision based on limited resources and the fact that most people with a science background are accustomed to working in English. Most interview respondents felt that the IPY EOC process worked well, despite the limitations imposed by language, primarily because of the personal relationships of respect, trust and friendship that were developed, and the openness and support of the IPO staff.

There was general agreement that native English speakers did have a greater influence on the functioning of the committee and working groups, but it was not possible to isolate the specific effects that language abilities, individual personalities, cultural differences, and the participants' organisational roles had on the overall program.

It was also agreed by the majority of the respondents that, while they personally were generally comfortable with working in English, the use of English was an important determining factor in other people's decisions whether or not to participate in the working groups or to take part in the international activities. Two important questions arising from this are: How do we avoid this kind of exclusion? How do we tap into the expertise and interests of those who don't speak English or who don't speak it well?

A lack of representation at the committee and working group levels from many countries outside of Europe and North America impacted the number of people who participated in the activities. It was felt that it was extremely important to have materials

available in native languages for use at both the school and public levels. Without strong representation on the committee or in the working groups, fewer materials were translated into the appropriate languages for those countries, and there was also a lack of an effective delivery mechanism to distribute materials and encourage interest in the topics. Volunteers were seen as essential to success of the international activities because they were the ones who translated many education materials, distributed them through their own networks, and built enthusiasm within their own countries.

Differences in school systems and national curricula also had an impact on the schools that participated. Many countries have very rigid state-mandated curricula, so anything that is outside of that has to be planned for well in advance. Again, a lack of representation of certain countries meant that the committee and working group members could not work as effectively with those school systems.

Experience working with an international group helped many of the IPY EOC participants learn more about environmental issues, as well as develop a greater sensitivity to cultural differences and a better understanding of the issues involved and methods of accommodating linguistic diversity. Although the IPY interviews were undertaken with adults, their feedback suggested that involvement with peers in other countries could have a similar benefit for children, and could help them develop skills that are becoming increasingly important in a globally interdependent world. The second part of my research, *Sharing our Planet*, was conceived as a way to investigate these ideas in more depth. I discuss this in detail in the next chapter.

Chapter 5: Sharing our Planet – Description, Analysis, and Findings

In the previous chapter, I reviewed the IPY EOC program and discussed the viewpoints related to language issues that were expressed by committee and working group members who were involved in international meetings and education initiatives. In this chapter, I first explain how the Sharing our Planet (SoP) international school project was developed, the principal goals of the project, and how it functioned. I then summarise my role as a researcher in the four countries involved, review my data collection methods, and briefly discuss the policies and perspectives towards the English language in each of the countries involved. Finally, I discuss the challenges, successes, and lessons learned as seen from both my perspective as a researcher/participant-observer and from the perspectives of adult participants in the project. Findings from both stages of the research are synthesised in Chapter 6.

My guiding research questions during this project were:

- Which of the strategies identified by IPY EOC participants were most effective in promoting better international communication and collaboration among children?
- What are the impacts of English-language domination of scientific research on science education and communication at both international and local levels?

Project Development and Goals

Between 2007 and 2010, I had periodic informal discussions, formal meetings (both face-to-face and virtual) and e-mail correspondence with both the Malaysian and Brazilian EOC committee members about how to encourage schools and students in their countries to have a greater involvement with IPY activities. Both EOC members felt that it was important for people in their countries to understand how the polar regions, especially changes in the polar regions due to climate change, could affect them and vice

versa. During these conversations, they expressed an interest in developing some country-specific education initiatives to help address this.

After the official IPY program had ended, a small group of us decided to start a project involving collaboration among students in four countries, asking them to share information about their countries and their environmental issues with each other. The schools included a Grade 7 public school class in Malaysia, a private high school English class in Brazil, two multi-age primary classes in the Magallanes Region of southern Chile (one private school and one rural public school), and a Grade 7 science class in southern Greenland. The students compared environments ranging from 64° North latitude (Greenland) to 53° South (southern Chile). Among the students were five national languages: Greenlandic and Danish in Greenland, Portuguese in Brazil, Spanish in Chile, and Malay in Malaysia (Figure 4).

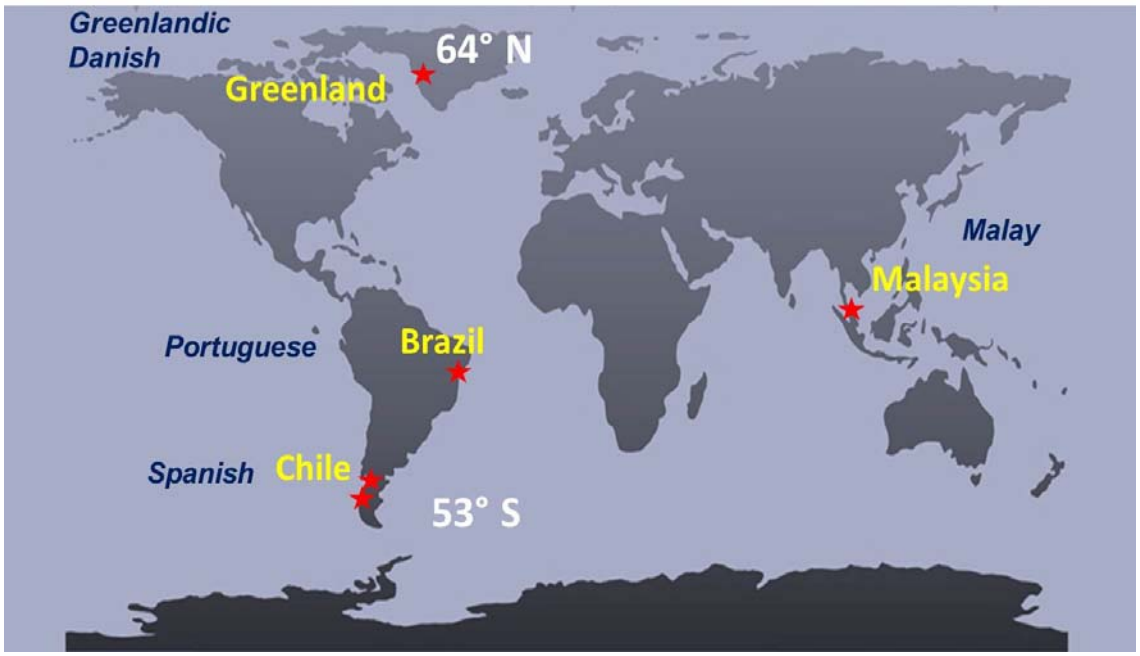

Figure 4. Location of Sharing our Planet participating schools (Base map: Wikimedia)

Project goals. Using an action research approach to the project development, we decided on three broad project goals:

- We wanted to help the students develop a better understanding of their own local environments, as well as an ability to identify both local and global environmental issues. We also wanted them to work towards finding solutions to some of the local problems.
- We wanted them to develop an awareness of their roles and responsibilities in a global society.
- Finally, we hoped to help them develop the personal skills that are needed to succeed in today's global society. These included interpersonal, intercultural and linguistic skills, as well as computer technology skills.

These goals correlated well with Boix Mansilla and Gardner's (2007) ideas of the importance of developing a global consciousness, which they defined as having three major components:

> ... *global sensitivity*, or our awareness of local experience as a manifestation of broader developments in the planet; *global understanding*, or our capacity to think in flexible and informed ways about contemporary worldwide developments; and *global self*, or a perception of ourselves as global actors, a sense of planetary belonging and membership in humanity that guides our actions and prompts our civic commitments. (p. 78, italics in original)

How it worked. The project spanned a time period from mid-August 2012 to early June 2013. During the course of the project, the teachers and I kept in regular contact through e-mails and periodic Skype calls.

To initiate the project, the classes introduced themselves to each other by creating and sharing short videos about their school and their town. Where this was not possible

due to technological limitations, they posted information and pictures on Edmodo, which is an education web-based platform that is similar to Facebook. After the students watched the videos, the teachers asked them to develop a list of questions they would like to ask the students in the other countries. In addition, we asked them what they would like other students to know about their country and their lives, and to post that information on Edmodo.

To get the students started on environmental dialogues, we created a four-part series of focus questions for each group or class to discuss and then share with the participants in the other countries (see Appendix 4). The first part, "Getting to know each other," asked them about the weather and climate in their region, what natural resources they had, and what life was like where they live. In the second part, the students investigated local environmental problems. Here we focused on pollution because this was a problem shared by all of them. In the third section, they investigated climate change and its possible effects on their region. The last part focused on sharing information about environmental projects they were developing.

We translated the focus questions into all of the native languages so that students could work through them in their own language before sharing their answers with students in the other countries. Sharing was carried out through a combination of Edmodo posts, e-mails, and a few live web conferences where the students had an opportunity to talk with each other directly. Communications among the classes were primarily in English, although the teachers helped the students with translations when necessary and served as interpreters for those who needed it during live web conferences.

My Role as Researcher

Before starting this stage of the research, I had made two visits to Malaysia (one for two months, the other for three weeks), living with Malaysian families and

undertaking volunteer work with a Malaysian youth environmental organisation. This involved a combination of professional and social events, as well as numerous informal conversations with local people about Malaysian culture, society and education systems. I followed this with a 10-day visit to Brazil, where I stayed with a Brazilian teacher and her family, visited her school and attended social events with her friends and extended family. The discussions I had earlier with IPY EOC people also helped me learn more about the local cultural and educational situations in the four countries that participated in the project, which is an important consideration when doing intercultural research (Irvine et al., 2007; Kapborg & Bertero, 2002; Laverack & Brown, 2003; Schmieding & Kokuyama, 1995).

Between February and December 2012, I served as a participant-observer for approximately two to three months at each of the selected case studies sites. I made follow-up visits of three to four weeks to each of the case study sites between March and June 2013. These visits provided a chance for evaluation of the project from the perspective of the participants, and served as a form of triangulation to enhance the validity, or "credibility" in Lincoln and Guba's (1981) terminology, of the study.

My participation varied in each of the countries according to the needs and interests of my hosts. In Malaysia, I worked together with a non-governmental youth environmental group in the greater Kuala Lumpur region and an environmental research institute at a Malaysian university, helping to develop environmental education materials for use in their school programs, conducting professional development workshops for volunteers from both the university and the environmental group, giving public talks about environmental issues, and assisting at two environmental camps (one a training for adult facilitators and one for middle-school students). This was a continuation of work that I had been doing for the past two years. The school that participated in SoP was

chosen because one of the teachers who attended the adult environmental camp was enthusiastic about having her class take part.

In Chile and Brazil, I was more of an observer than a participant. My participation in Brazil was limited to giving talks about Australia, Greenland and Malaysia to students for a Brazilian English teacher's classes, and doing an invited presentation about science communication at a workshop for polar researchers from Brazil, Argentina, Chile and Uruguay. In Chile, I facilitated a class for students who were studying to become English teachers at a local university, and did two presentations about Malaysia and Greenland to Grade 6 and 7 students at a small private school that participated in the project.

I made two visits to Greenland, the first one for three months and the second one for three weeks. During my first visit, I spent almost every school day as an observer in the Grade 6 and 7 science classrooms, and served as an informal science advisor to two teachers who were developing and testing an ecosystems unit of instruction for their students. I also facilitated some classroom science activities with the students, and gave a presentation about the project for the parents. Most of the student interactions with the schools in other countries took place while I was in Greenland, so the majority of my direct observations of how the students participated and reacted to the project are from that perspective. One of the Greenland teachers also served as the "host" for the web conferences with the other schools.

The overall program development is shown in diagrammatic form in Figure 5.

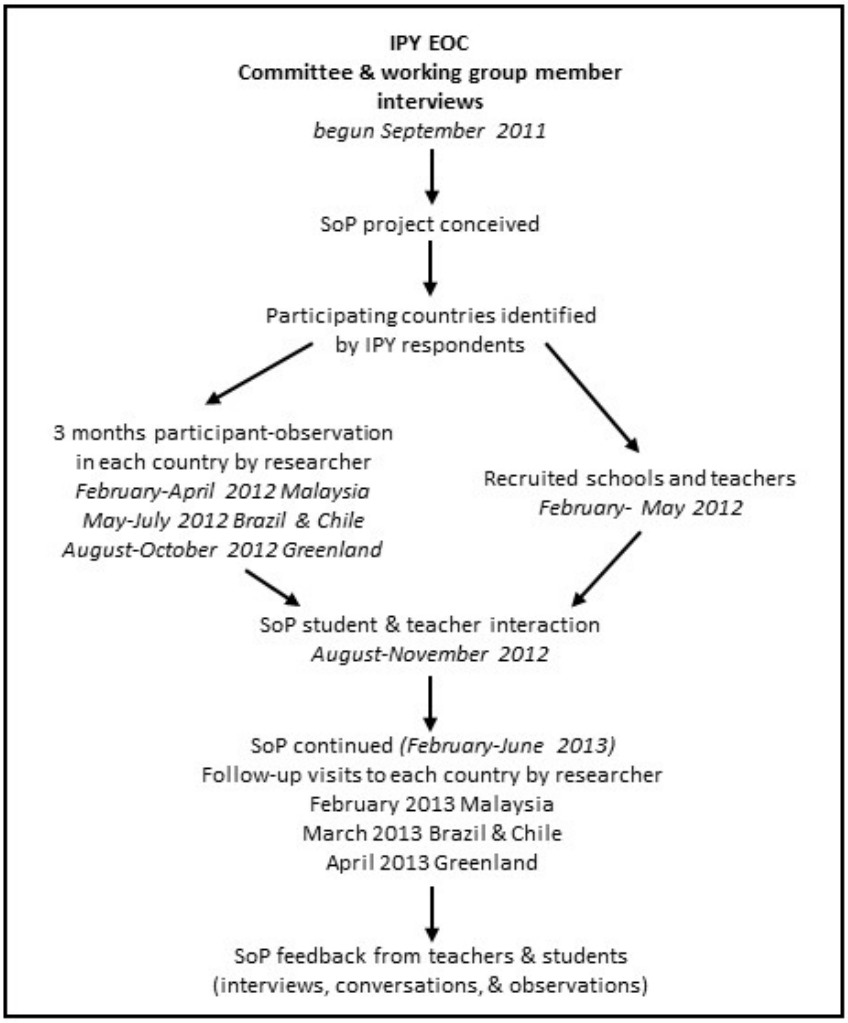

Figure 5. Sharing our Planet project development process

Data Collection

During my time in each country, in addition to helping with the overall SoP project coordination and working on the country-specific projects, I collected more data through observation, semi-structured interviews (conducted in either English or Spanish), and informal conversations with key project facilitators and participants. The interviews were done with adults (university student level or older). While it would have been ideal to include interviews with younger students, this was not practicable because of the complicated ethics approvals needed for working directly with children.

In general, the interview questions were similar to those asked of the IPY EOC respondents to investigate their opinions about the positive and negative aspects of using English as a lingua franca and to get their suggestions for ways to improve cross-linguistic and intercultural communication. However, I also asked the questions, "In your opinion, how important is it for children in your country to learn to communicate in English?" and "Why do you believe this?" It must be remembered, of course, that most of the people interviewed (with the exception of two Spanish speakers) were at least conversant in English, so their opinions may give English learning a higher degree of importance than many other people in the country would have.

In Malaysia, some data were also collected by means of a written survey of 52 teachers, university students and government employees who were attending an environmental camp. In this case, they had the option of answering the questions in either Malay or English. Thirty of the respondents chose to answer in Malay, and their answers were translated to English by a fully bilingual staff member from the environmental group. This person had also translated the original survey from English into Malay after consultation with me and two other Malaysian staff members.

Twenty-three respondents of a similar survey at the South American polar research workshop were given the option of answering in Portuguese, Spanish or English. For this survey, I prepared the English and Spanish versions, and it was translated into Portuguese by a Brazilian English teacher who was also involved in polar education. The Spanish version was also reviewed and approved by an Argentinean researcher before the survey was handed out to workshop participants. Ten people chose to answer in English, six in Portuguese and six in Spanish. One person used a combination of English and Spanish.

When talking with scientists and social science researchers, I also explored the issues of the impact of English dominance on academic research and publishing, because this was something that had emerged quite prominently during the initial IPY interviews. I believe the answers to these questions may have important implications for education, especially in the fields of science and environmental studies.

The Role of English in the Countries Involved

The four countries had different colonial histories, as well as different attitudes and educational policies towards the English language. As a result, the level of English fluency among the students varied greatly, and this had a direct impact on the functioning of the project. It was also an issue that came up frequently in interviews, conversations, and written surveys in all four countries, so I summarise the similarities and differences among the countries and discuss my respondents' perspectives in this section.

Malaysia. Malaysia is a multicultural, multilingual country, with three main ethnic groups: Malay (about 50%), Chinese (approximately 24%), and Indian (7%). Various indigenous groups make up another 11% of the population. Each of these groups has its own vernacular language, although Malay is the country's only official language (One Europe, 2013).

Malaysia's long history of British colonialism has had a major impact on the nation's language policies. During the colonial period, English was the language of government and business, and most schooling was also in the English medium, at least in the urban centres. At the time of independence, the 1957 Constitution of Malaysia proclaimed that Malay would be the national language, even though less than 50% of the population spoke Malay at the time (Zarrinabadi, Ketabi, & Abdi, 2014). The

Constitution gave English co-equal status for the following 10 years, or until the National Language Act of 1967 was passed (Crystal, 2007).

Malay had replaced English in all English-medium primary schools by 1978 and in all secondary schools by the early 1980s. The language policy also required all students to obtain a credit in Malay before they could receive the Malaysian Certificate of Education, which was required in order to receive a tertiary education or obtain a government job, and there was a gradual change to the use of Malay in all university instruction as well (MacIntyre, Clément, Dörnyei, & Noels, 1998). In the Malaysian education system today, there are national Malay-medium schools, and national-type schools (sometimes called vernacular schools), which use Mandarin Chinese or Tamil as their medium of instruction (Ali, Hamid, & Moni, 2011).

English language proficiency steadily dropped in the national schools as a consequence of the switch to Malay instruction, resulting in a generational gap and a higher rate of unemployment among Malay-educated graduates (Ali et al., 2011; MacIntyre et al., 1998). In an attempt to address this problem, the Malaysian government introduced a policy (PPSMI) in 2003 requiring the use of English as the medium of instruction in secondary school mathematics and science (Ridge, 2004). The PPSMI was reversed in 2012, with the Ministry of Education stating that there were practical problems implementing the policy, as well as concerns about poor examination results, and increasing polarisation between the urban and rural populations (Ali et al., 2011). This is the status of English in Malaysia today.

This policy reversal has been extremely controversial, both in terms of its justification and its potential impact on students in the future. One of my Malaysian respondents made the following observation:

> So much, I think personally, is politically motivated, rather than being, being, what shall I say? What's the word? Uh, being practical about the whole thing. You know "If I'm a nationalist, it must be in Bahasa Malaysia. If it work for me, I'm your man," you know? It's not practical at all. I asked this before. All these politicians, you should ask them, "Excuse me, sir," to Mr Minister, "Where are your children studying?" "Uh, UK. Uh, US." I rest my case. I rest my case. "So let me get this, Mr. Minister. Your children will come back English-educated and will be the boss. And those locally Malay-educated will be the executives, lower down staff, the clerical. Am I right?" [laughs] Because they studied overseas. When they come home, they expect to have a job and wear a tie and a suit and stay in a room, an air-conditioned room. Whereas those people working outside, serving people, will be those people with local education. And you will say, "Oh, because your command of English is not that good." And you will say they cannot interact, and you will say that their presentation skills is hopeless, so, you know, what double standards that is. *(NNES respondent)*

In discussing language policies in India, Ricento (2010) noted a similar phenomenon. In the perceptions of many parents, education in native languages (as opposed to English) was helping to increase the socioeconomic divide among the nation's people because English fluency was associated with social status. Students in India who had received English-medium instruction were generally middle class and had better access to higher education and, therefore, more lucrative careers.

Other Malaysian respondents in my study expressed similar views, feeling that their children would be disadvantaged if they don't learn to speak English fluently:

> My children will always, after they are in Form 5, we call it high school, they will go for the diploma in a private institution where English is the medium. I do not

> send them to any government college because the language being taught is in Bahasa. And I feel a lot of my fellow countrymen, children you know, are being neglected. Because to me, English is the medium of knowledge of the world. To me. To me. Some people may be nationalist, I am nationalist, but when it comes to knowledge it's definitely, you know, English. So when they go from government high school, they will go to private institutions and universities. When they graduate with a diploma, I'll send them to Australia. Each and every one of them. *(NNES respondent)*

On the other side of the debate, some respondents felt that children were often confused by the use of English in science and mathematics, in large part because the teachers were not fluent enough to teach effectively in English. One person commented, "The teachers are not very fluent in English. So, even if the syllabus is in English, when the teachers teach the students they still teach in Malay, in Bahasa. So, the students are becoming confused." *(NNES respondent)* Another agreed with that as she spoke about her own children's experience: "I see that my children have difficulties in really understand the basic concept of mathematics and the basic concept of science, if the textbook is in English and the teacher teaches in Malay." *(NNES respondent)*

The issues around the lack of fluency in English were seen as being particularly problematic in the rural areas: "Here in Malaysia, those children from the remote areas, they are not exposed to television, things like that, then they wouldn't know how to speak in English, [or languages] other than Bahasa Malaysia." *(NNES respondent)*

Another issue expressed by several respondents was that their own use of English negatively impacted their fluency in Malay. Two Master's degree students from the university told me that they would never have been able to write their theses in Malay because they had been educated in English-medium schools and lacked sufficient writing

skills in Malay. One professional told me that he was so much more comfortable speaking English than he was in Malay that it occasionally had an impact on his work:

> My native language is Malay, but in my household we have been speaking English since I was young, I think because my parents were educated during the colonial times and schools were all taught in English. So we actually spoke English at home and when I went to school, those days it was all conducted in English. In fact, so much so I am more comfortable speaking English than Bahasa, especially during formal occasions when I have to give a speech. I usually see, whenever I start speaking Malay, my staff start laughing. *(NNES respondent)*

Another respondent told me that in her home they used a mixture of languages, which meant that they didn't speak any language correctly:

> We seems to be forgetting our own language, our native language. For example, my family, we speak all *rojak* [a Malay word for a type of stew], all kind of language in the house. We doesn't use the right Bahasa Melayu, we don't use the right Bahasa English, and also we don't use the right of Arab. Is mix. So the language become not really good in any language, actually. That is the bad thing about it. And because when we are meeting friends also, when we meet Malay we will speak Bahasa Melayu, but sometimes with Malay also we speak English. If we meet Chinese or Indian, of course we always use English. So we try to forget our mother tongue language. *(NNES respondent)*

Despite the concerns about English-medium education and the possible resultant loss of fluency in Malay, there was an overwhelming consensus among my respondents that it was important for children in Malaysia to learn English. One of the questions on the written survey was, "How important is it for children in Malaysia to learn to communicate in English?" The respondents were asked to rate this from 1 to 4, with 1

being “not important at all,” and 4 being “essential.” The average rating from the 43 responses was 3.3, with 19 people giving it a rating of 4. Only four respondents rated it lower than 3. The reasons that these people gave for giving it a rating of 2 or 2.5 were: “Understanding is more important than communication,” “English is easily understood by students,” and finally, that it was not necessary to teach English in school because “as they grow up, by inference/self-learning automatically they can understand and communicate in English.” Only one person expressed the feeling that English was relatively unimportant because the Malay language needed to be upheld. These responses seemed to indicate that most of those who gave it a lower rating did so because they felt that children already had a good command of English, or would gain it through general exposure, rather than because they didn’t think the command of the language was important.

Greenland. Greenland is a land of extremes. More than 80% of the total land mass is covered by ice, so all towns and settlements are found along the coastline. As there are no roads between settlements, travel between towns is done by air or sea. As of 2014, the total estimated population was around 58,000, a quarter of whom live in the capital city of Nuuk. Overall, approximately 89% of the population are Inuit, with Danes making up the bulk of the rest (CIA, 2014c).

Greenlandic and Danish are both official languages that are used in government, business and education, and many Greenlanders are bilingual in these two languages (T. R. Wyatt, 2012). Greenland has been closely tied to Denmark since the early 18th century, when Norwegian cleric Hans Egede established the first mission at the behest of the King of Denmark. It remained a Danish colony until 1953, when Denmark formally incorporated Greenland as a Danish county and gave Danish citizenship to Greenlandic residents (Gad, 2009).

In 1979, partially in response to fears that Greenlanders were losing their language and their culture, the Home Rule Act was passed. This stated that Greenlandic would be the official language, but that both Greenlandic and Danish were to be taught in schools, and either language could be used for official purposes (CIA, 2014c). Greenlandic became, in principle, the medium of instruction in schools, with Danish taught as a foreign language starting in Grade 4. In practice, however, Danish remained the main language of education due to a lack of qualified Greenlandic-speaking teachers. Several other attempts were made over the next two decades to complete the switch to Greenlandic as the medium of instruction. These have had limited success due to a combination of factors, including a lack of Greenlandic teachers, limited availability of educational materials in Greenlandic, and the fact that most instructors at the University of Greenland are Danish or Danish speakers (Jacobsen, 2003).

The move to strengthen the Greenlandic language and culture continues today. The Act on Greenland Self-Government, which gave Greenland greater control over their own affairs, became law in 2009 (CIA, 2014c). Another education initiative, called *Atuarfitsialak* or "the good school," began in 2002. Under this program, schools are now bilingual, at least in theory, and both Greenlandic and Danish are used in instruction. English is taught as a third language starting in Grade 4, but is often introduced earlier (Jacobsen, 2003; Spellerberg, 2011).

This move towards greater independence, combined with the effects (and projected future effects) of climate change, puts attitudes and policies towards the English language in an interesting position. Despite Greenland's move toward greater autonomy, more than half of their annual budget in 2012 was still subsidised by Denmark (CIA, 2014c). However, accelerating warming in the Arctic is opening new economic opportunities for the country. Melting of the ice cap is exposing more land and making

mineral exploration easier and more economic; decreasing sea ice is creating new shipping routes; and there is an increased interest in climate research in the country (Gad, 2014). As Greenland opens up to these new markets and potential new business partners, language priorities are shifting. Some people are now arguing that English should replace Danish as the second language taught in Greenland schools (Gad, 2009).

All of my respondents felt strongly that learning English was very important for Greenlandic children and for Greenland's future, but there were mixed opinions about whether or not it should be given priority over Danish in the schools. Three respondents, two Danish and one Greenlandic, felt that English should be given priority over Danish in education. Their reasons were that English was much more widely spoken than Danish and would serve the children better later in life, especially as Greenland becomes more independent:

> It should be English as a second language and then maybe Danish as a third language because English is a large language, which is spoken all around the world, and Danish is also just a small language, which only 5 million people speak. English is definitely more important than Danish. *(NNES respondent, Greenlandic teacher)*
>
> I have to be a bit careful how I put this, but in my opinion, I think they could, they should just convert all the Danish to English. Because if Greenland wants to be on their own, and with everything happening in Greenland and the Arctic and all around the world, Danish is a small language with only 5 million people who speaks it. So I think that Greenland and the youth of Greenland would be better off if they were to learn English as their second language instead of Danish. … even when you study at universities in Denmark, almost every education has a semester or two where everything is in English. And all the papers that you assign

> … exams and stuff like that, a lot of them are also in English. Or at least some parts of it. So, I think they would be better off if they were to learn a lot more English. And cut down on Danish. *(NNES respondent, Danish teacher)*
>
> [English is] so much more important than Danish. I would say, if you speak Greenlandic, you have 100,000 friends. If you speak Danish, you have around 10 million friends. If you speak English, everybody's your friend. I think there's some truth in it. You won't get by in education anywhere if you don't speak English. And of course, Danish is a problem too because many of the books are in Danish. But if you go to university anywhere you have to speak English. So in my opinion, it's necessary and we have to focus and give them more and more emphasis. *(NNES respondent, Danish teacher)*

Others did not agree with this. One of the major arguments given for keeping Danish as the second language was the fact that, at present, Greenlanders are Danish citizens and do not have to pay to attend university in Denmark. As one teacher remarked:

> At the present time, all Greenlandic students have access to education in Denmark, and for free. And the taught language is, they will be taught in Danish. Of course there are many, many different texts they will have access to, or be expected to read at a high level in English, but we cannot get around the fact that they will be taught in Danish. I do not believe that it is widely acknowledged that, if students from Greenland were to move to England and America, for example, to study, I don't think anyone has really thought about how much that would cost. *(NES respondent)*

Another respondent pointed out that the Greenlandic government had tried sending students to English-speaking countries to study in the past but that it didn't benefit a lot of people because it was prohibitively expensive:

> You can go to Denmark and study, freely, as it is now. And if you, if you change that and say we are just going to take Danish out of our school system, then the pupils would not be able to go to Denmark and study. Which I think is dumb. I mean, why take away that opportunity? And they did try it in the 80s, to have students go abroad and study. And, uh, I have a brother who's educated in Canada and Alaska. And so, there are maybe 20, 40 Greenlanders who have that kind of education. And it's, it was so expensive. *(NNES respondent)*

Even those who choose to attend university in Greenland rather than travelling to Denmark must have a mastery of the Danish language because that is the language of instruction:

> The language of education, the language used to teach is Danish. Apart from in subjects such as Greenlandic, of course. But it falls under the Danish education system and this is where we start to have problems when Greenlandic students who do not have the, who are not so good at speaking Danish will, of course, automatically have a problem. But that's the way it is. And it's widely recognised that this is an area of difficulty. But at this time we do not have teachers who can teach all the different subjects in Greenlandic. *(NNES respondent)*

Some people also felt that it is important to keep Danish for cultural reasons, pointing out that Greenland has had ties with Denmark for centuries and that it is part of the heritage of many Greenlanders:

> We also have people like me who have a Greenlandic father and a Danish mother. And my mother tongue is Danish. What about us? I mean, I think it's a discussion

> that you might, that you can take intellectually, but if you go down and look at the roots, and how we are connected, as two countries, I don't think it's possible to, to take that away like that. And I think the more we, as Greenlanders, [pause] what do we call it? do not appreciate our past, the more we will cut the roots. The Danes will cut the roots to us. And I don't think that's the best solution for us as a country. *(NNES respondent)*

There are also practical issues around the teaching of English, in particular the lack of qualified teachers. One respondent pointed out that past experiments to switch to English as the second language had not worked:

> If you look globally, it's more important than Danish. But Danish is the first language they learn, foreign language. And then English. And, uhm, they tried back in the early 80s to change that to, it would be better, they thought, to jump over Danish and just have English as the first second language. But it is not possible to collect so many English teachers in Greenland. To have them here. And how are you going to change a major language like Danish, to just change it out for English? Because it's better, globally. It didn't work. But the government thought they could do it. … I can recall them introducing English before Danish, I think, in the small grades. And then they found out they couldn't do that either, because there were not enough English teachers. *(NNES respondent)*

According to the teachers I spoke with, about 60 to 70% of children in Nuuk already speak some Danish when they start school. The situation is very different in other parts of Greenland. A teacher from a school in a northern town said that almost none of the children at her school speak any Danish when they start school, so they are expected to learn two completely new languages, Danish and English, both of which have a very

different structure from Greenlandic, which makes it extremely difficult for these students:

> There's actually been a debate here in this school about, why should we teach the students Danish. Why not just go and teach them English? Because it opens up more of the world for them to learn English. Because if they only learn one language, shouldn't it be English? But I think it's the, what do you say? Uhm, in my opinion, Danish is easier for them to master because they've got a community with a lot of Danish influence. There's Danish everywhere. And there are a lot of Danish people living here, so it comes naturally, in my mind, that they should learn Danish first. And then English. But, it's difficult to say because they <u>have</u> to learn English as well, because otherwise they will get excluded. And so I think it's really important, but it's difficult. It's really difficult because the level is so low. *(NNES respondent)*

She went on to say, however, that she believed that learning English was also vital, in large part because of the growing tourism industry in the region and the impact this is having on the native culture: "And most of the guides are Danish because they know the languages. So that's, that's not healthy for the Inuit culture, to give that much job away just because they haven't learned enough." *(NNES respondent)*

There was overall agreement among the respondents that both Danish and English were necessary for Greenland's future. Not only are both languages needed for higher education, but English is also necessary for the people of Greenland to have a voice in international affairs and to make the rest of the world aware of their country and their culture:

> Unfortunately, it's important for them to learn both Danish and English because … Danish is … their way of getting an education. They need to learn Danish to

> get an education because they can get it in Denmark for free. Plus a lot of Danes live up here and a lot of Danes only speak Danish. So, like, if they want to be able to communicate, even in Greenland, they have to learn Danish. If they want to be successful in Greenland even, they have to learn Danish as well. And English is also important because I think, both for the cultural reason, like it's important for them to be able to communicate with the world and say, "This is Greenland. This is who we are, the people who live in Greenland." It's important to communicate. *(NNES respondent)*

Brazil. Brazil is the largest country in South America, and the fifth largest country in the world, with an area of 8,514,877 sq. km (CIA, 2014a). According to *Ethnologue* (Lewis et al., 2013), there are currently 215 living languages in Brazil, although more than half of these are small indigenous languages that are listed as either being in trouble or dying out. Portuguese is the only official national language, and is used exclusively in government and education. With the exception of the three small countries on the northeastern border (Guyana [English], Suriname [Dutch], and French Guiana [French]), Brazil is surrounded by Spanish-speaking countries.

The combination of geographic size, its position in South America, its Portuguese colonial history, and ongoing tensions with the United States puts Brazil in an interesting position when it comes to language policy and language education. On the one hand, there is a strong feeling of distrust about the increasing use of English as an international language because it is seen by many as one more example of encroaching US hegemony that perpetuates Brazil's economic and political dependence on the US (Rajagopalan, 2003). On the other hand, there is widespread recognition that English is needed if Brazil wants to increase its role in global trade and extend its global influence.

There is also the fact that most of the rest of South America is Spanish-speaking and some people feel that Brazil, despite its size, is often overlooked. In his study of geography publications, Marcus (2011) lamented what he felt was a distinct Spanish-centric bias in South American geography research published in English-language journals, and said that Brazil's contributions to the field were often ignored. He blamed this in part on the English-dominated nature of academic publishing, and in part on the large Spanish-speaking community of intellectuals living in the United States.

The love/hate relationship with English has continued since the 1960s when English replaced French as the favoured second language of the Brazilian elite. Various attempts have been made by the government over the past decades to downgrade the status of English (El-Dash & Busnardo, 2001; Rajagopalan, 2003). Starting in 1996, however, Brazil's education policy required all students to study a foreign language starting in Grade 5, and stated that a second optional language must also be offered. The choice of languages was left up to the schools, and English is now the most commonly taught foreign language (EF Australia, 2011). The Brazilian Ministry of Education emphasised, however, that it was important not to overlook issues of the imbalance of power relations that are caused or perpetuated among different social groups and countries by the use of English as an international language (Matear, 2008). Teachers of English were encouraged to teach an ideologically "neutral" version of "instrumental English" in the classroom as a tool for learning about science and technology (El-Dash & Busnardo, 2001, p. 58).

Although students in all schools are required to study a foreign language for approximately three hours per week for eight years (EF Australia, 2011), most of them do not learn to communicate in that language unless they take private lessons or attend a

private school. As one Brazilian English teacher told me, in public schools the focus is on written translation, not communication skills:

> [In public school] they learn English in order to pass the exams for university, yeah, the university entrance exams. And my private students learn English because they want to communicate in English. That's a different thing. So, at school what we do is train them mainly for this university entrance exam. *(NNES respondent)*

This sentiment was echoed during a conversation I had with some participants at the polar researchers' workshop I attended. In my field notes, I wrote:

> During lunch, I was talking with two Brazilian women who teach at Brazilian universities. They both agreed that learning English in Brazil is very expensive because it has to be done through private classes or attendance at a private school. According to them, the public schools are very poor in quality, especially in the northern part of the country. This is partly due to underqualified teachers (low pay, not much training), lack of resources in the schools, and aggressive students (due to drug problems, poverty, and family violence). They said that if you can possibly afford it, you put your child in a private school. *(author's field notes)*

Due to the disparity between public and private education, English still remains, for the most part, the cultural capital of the privileged upper-middle or higher socioeconomic classes (Rajagopalan, 2003). This was strongly reflected in comments made by the 15 Brazilian researchers and postgraduate students who completed the written survey I had prepared, most of whom said that they learned English either through private schooling or during study abroad programs in English-speaking countries:

> I learnt basic English in school. However, it only got reasonable after 2010 when I moved to Ireland for a year.

> I've been learning/studying English since 2000 in a private English school.
>
> I did a PhD in England – lived there for 6 years in total.
>
> I have learned English when I was an exchange student at United States.
>
> I studied in an Institute of English.
>
> I began to study English when I realised (at the beginning of my university study of biology) that I needed it to read books and papers, to communicate with colleagues, and to keep myself up to date. *(NNES comments in written survey)*

The Brazilian government is now encouraging a broader spectrum of people to learn English. This is in part because of recent or upcoming international events such as the World Cup and the 2016 Olympic Games, and the realisation that there is a general lack of English competence even among people in the tourism industry (Ballard, 2013). There is also a recognition that Brazil's universities are losing out on international students and staff exchanges because of language barriers (Downie, 2010). In 2011, the Brazilian government made plans to send 100,000 university students to study science, technology, engineering and mathematics subjects overseas. However, they discovered that many students lacked sufficient English skills to undertake foreign study. As the Brazilian Higher Education Secretary, Paolo Spelling, said in an interview (as cited in Lloyd, 2014):

> The idea is that the students have the opportunity not only to live in another country, but also to develop fluency in another language, in particular – although not exclusively – in English. We realized that a large number of students did not have the necessary fluency in English, so we created a new program called "English without Borders," which is currently operating in all, or virtually all, the federal universities (para. 6).

English without Borders (*Inglês sem fronteiras*) is an online English language learning program designed to help university students improve their English communication skills (TOEFL, 2014). Although this may help improve English competence at the university level, it does not address the systemic disparities of equality at the level of primary and secondary education.

Chile. Located on the west coast of South America, Chile extends north-south over 38º of latitude, giving it the longest coastline of any country in the world. Spanish is the only official language, despite the fact that numerous indigenous groups make up about 10% of the population. (CIA, 2014b).

Chile is bordered by other Spanish-speaking countries, which in the past has limited the necessity or the incentive of many people to learn another language. Since the establishment of democracy in 1990, however, English has been given a higher priority in education because the government sees it as necessary for economic growth in a globalised market (Matear, 2008). In the Magallanes region of southern Chile, where my research took place, all of my interview respondents agreed with the official government perspective that it was important for children to learn to communicate in English. They gave various reasons for this, as indicated by their comments below.

One respondent, who spoke no English herself, felt that at least a basic knowledge of English was important for everyday life simply because of the amount of English that people were exposed to:

> I think, from the point of view that for the last decade, more than half of the elements that we come in contact with are in English, so of course it is necessary. I am referring to materials for study, and consumer products from the Free Zone [a duty free shopping area with many imported products], right? And many home appliances come with instructions in English that we don't understand, right? Not

> to mention other things – music, television programs, and above all tourists. Because they are coming and it is necessary to attend to these people. From this point of view, it is also necessary. *(NNES respondent, author's translation)*

Tourism was seen as a very important reason for learning English, as noted by another respondent:

> This is a city that is basically touristic. For great periods of time, basically from December until March or April, our city is full of tourists. And suddenly, we can't give the information that they ask for because of not knowing English. So the fact is that the students need to … improve their abilities in the language. *(NNES respondent, author's translation)*

The same respondent went on to say that knowledge of English increased both people's potential for employment and their ability to undertake university study. Although most universities in Chile teach in Spanish, many of the textbooks and other readings are in English. This is especially true in the science disciplines:

> Undoubtedly knowing English gives them greater opportunities for work, and the same thing in the university. The great majority of the textbooks that they suddenly have to read, because they are part of the literature for the major they are studying, there are more texts in English than in Spanish. *(NNES respondent, author's translation)*

Another respondent agreed with this, noting that even if a text was translated from English, much important information might be lost to the reader:

> I would say that to study most subjects nowadays, I think it is obligatory. I don't know if this is good or bad. But it is obligatory. Because now it's the fashion, for the latest information is normally in English. The translations are not always appropriate. The texts that one can read that have been translated from English are

> very difficult to understand because the complexity of ideas is lost in the translation; therefore, you have to read the original. *(NNES respondent, author's translation)*

One young Chilean woman I spoke with underlined the importance of learning English for higher education. She told me that when she was in school, she only had two hours of English per week and when she started university she really didn't know the language at all. It was a shock to her to find that all the reading she had to do for her biology major was in English. She had to hire a translator to translate all of the reading material for her, which was both time-consuming and expensive. She now has a four year old son and has already enrolled him in a bilingual school.

Finally, one person gave his opinion that English was essential for international communication and the continued development of the country:

> It is essential because it is the language that allows you to communicate with others – with other countries, with other people. In addition, it is fundamental not only for intercultural interchange, but also it is important for the country to advance so that it can become part of the international consciousness from the point of view of culture, politics, technology, and above all economically. *(NNES respondent, author's translation)*

Despite the government's stated emphasis on English learning, English was not officially part of the national curriculum until 1998. Even then, teachers did not have an established syllabus to follow and there was little coordination between teachers' professional development and their classroom practice. The focus was generally on written translation, rather than development of communication skills (Munoz, 2010).

In 2004, the Chilean government instituted a new language education program titled *Inglés Abre Puertas* (English Opens Doors). This program requires all schools to

teach English for two to three hours per week starting in Grade 5 and continuing to the end of secondary school, Grade 12. This initiative also receives support from the business community and the United Nations Development Programme. In addition, native English-speaking volunteers are placed with schools when possible (Matear, 2008).

Despite this initiative, comments from my interview respondents indicated that there are still problems with the system overall. Although the Chilean government has invested substantial resources in training teachers and helping them improve their skills in English over the past decade (Matear, 2008), this remains a significant limiting factor in many schools. I was told by two Chilean English teachers that they felt their English skills were good when they graduated from university, but that they quickly lost those skills when they began teaching because "when you start to work in the schools, suddenly you don't use the language very well or constantly because it is the bad custom here to teach English in Spanish. You explain in Spanish." *(NNES respondent)*

This makes it much more difficult for students to master the language. One scientific researcher related his own personal experience:

> For me in high school, it was very difficult for me to learn the language. It was when I went to Australia and England that I realised that there were problems with the methodology of the teachers. And that is a serious problem in Chile. It's how they teach the language. *(NNES respondent, author's translation)*

In a focus group meeting with eight university students who were studying to become English teachers, I heard similar remarks as shown in this excerpt from my field notes:

> Again, I heard the refrain that I had gotten from people attending the polar science workshop in Brazil – learning English is expensive. They all said that they had studied English in school, but they hadn't learned it there, unless they attended a

> private school. One person also said that when students such as themselves graduated from university, they could speak English fairly well, but that they gradually lost their abilities after they started teaching because they never had a chance to use the language. This agrees with what J and P told me in Brazil – most of the English classes are taught in the native language of the country and English conversation is not part of the class. *(author's field notes)*

A teacher at a small private school agreed that most of the instruction in their English classes was given in Spanish, and cited time as the major factor: "We have to cover a very lengthy curriculum each year and it just takes too long to explain everything in English and get the students to understand." *(NNES respondent, author's translation)*

An overriding problem is that there remain great inequalities in the Chilean school system that continue to support the existing class structure and social stratification. There are three different types of schools in Chile: regular public schools, publicly-funded private schools, and fee-paying private schools. This last category of school is the most well-resourced, has trained specialist teachers, and is attended by the children of the highest socioeconomic sector of the population. Regular public schools, however, have far fewer resources, and are often in places where parents do not place a high priority on education (Matear, 2008). As one of my respondents remarked when speaking about low levels of scientific understanding among the general public:

> In Chile there are grave problems with education. There are problems much before saying that science education is important. There are segments of the population where education in general is not important. Therefore, when a country that has great problems with the starting institution, where the strategy to change your reality, your way of life, is not education, it is a great problem. In addition, there is a great difference in the quality of the teachers and the textbooks, as well

as in the quality of the resources and the cultural capital, between private and public education. *(NNES respondent, author's translation)*

There was considerable interest in the SoP project from teachers I spoke with from two different schools, as well as from the local office of *Inglés Abre Puertas* because it linked directly with the stated philosophy of the Chilean Ministry of Education:

> *En un contexto como el nuestro, en que el inglés se considera lengua extranjera, cobran gran relevancia las oportunidades que tenga el alumno de contactarse con el idioma en sus clases de inglés. Entre otros factores, contribuirán a alcanzar los niveles esperados que el docente use el inglés en todo momento, exponga a los estudiantes a variados textos orales y les dé la posibilidad de participar en actividades que requieran interacción en el idioma* (Ministerio de Educación de Chile, 2012, p. 3).
>
> (My translation: In a context such as ours, in which English is considered a foreign language, opportunities for students to connect with the language in their English classes are extremely relevant. Among other factors, these will contribute to reaching the hoped for levels so that the teacher will use English all the time, expose the students to various oral texts, and give them chances to participate in activities that require interaction with the language.)

Summary of countries involved. Earlier in this chapter, I briefly discussed the different roles played by English in government policy and education, as well as the different perspectives expressed by adults I spoke with in each of the countries that were involved in the SoP project. While learning English was considered to be very important for children in all four countries, respondents in Brazil and Chile expressed the greatest concerns about the difficulties that language issues might cause for the students and

teachers, saying that some students might not be interested or willing to participate in the project if they had to communicate in English.

One respondent felt that the disinclination to participate stemmed more from a lack of confidence than a lack of interest:

> I think they have a lot to say about the subject, but suddenly the hitch might be the language. They are capable of giving their opinion in another language, but I think also the children may fear that they are not doing it well, possibly they are making mistakes, and others are not going to understand well. So this is also a factor that limits the participation of Chilean young people, for example, from giving their opinions about subjects like the environment. *(NNES respondent, author's translation)*

The remainder of this chapter describes the SoP project and examines the challenges, successes and lessons learned in regards to international communication and collaboration in this setting. It also examines how some of the ideas and suggestions for improved communication recommended by the IPY respondents in the previous chapter actually worked in an educational setting with children and youth.

Project Challenges

SoP linked classes of students from four countries with very different cultures and five different native languages, none of which were English. The students ranged in age from 10 to 17 years old. At the beginning of the project there were two schools in Brazil (one private Grade 10 English class and one public primary school environmental group of mixed ages), two primary school environmental clubs in Chile (one in a private school in a small city and one in a rural public school), one Grade 7 environmental class in a

public school in the greater Kuala Lumpur area of Malaysia, and a Grade 7 science class from a public school in Nuuk, the capital city of Greenland.

As might be expected, there were numerous challenges with a project of this nature. The teachers and I kept in contact with each other through e-mails and Skype calls and tried to work through these challenges over the period of a year. I have divided the challenges into three areas that are discussed independently below: time, languages, and technology.

Time. Our first challenge was time. Since we were communicating with schools in both the Northern and Southern Hemispheres, the school years were different. Holidays also varied from country to country. Time zones can also be a problem with international projects if you are including real-time live events such as web conferences. Greenland, Chile and Brazil were at most two hours apart depending on the time of year, but it was more difficult with Malaysia. When we did web conferences between Greenland and Malaysia, the Malaysian students had to participate after school hours.

Due to these time limitations, although we did succeed in having three live web conferences, we also included ways of communicating asynchronously using e-mail and Edmodo. This also helped address the issues of pace and wait-time that were identified in IPY as being problematic with international communication. When using these forms of communication, the teachers and students had time to discuss what they wanted to say in their native languages and figure out how to write it in English. Before the web conferences, the teachers also introduced the topics to be covered and worked with the students to prepare appropriate presentations.

Available class time was also a factor that we had to consider. To increase the available class time, the Greenland teacher incorporated the project into her science, English, and Danish language classes.

Another limiting circumstance was the fact that two of the teachers changed classes or had their school responsibilities changed partway through the year, thus affecting their time and availability. Teacher illness also affected the project – one web conference was cancelled at the last minute because a teacher in Brazil contracted dengue fever the day before the scheduled conference. This highlighted the fact that we should have had more than one teacher participating at each school, so there would have been a backup in situations like this. A project of this nature this takes an incredible amount of time, dedication and passion on the part of the teachers involved.

Languages. Languages, of course, were a challenge since not all of the students or teachers involved spoke English, and there was no other common language. As research has shown that children tend to learn best using their native languages (National Association for the Education of Young Children, 2009), and we also wanted to make sure that students were not excluded from the project if they didn't speak English, we translated the focus questions into all five languages so that students could work through them in their first language before sharing their answers with students in the other countries. I originally wrote the questions in English and then discussed them with the teachers to get their suggestions and make sure they were appropriate for use with their students. After I made any suggested revisions, the teachers or other volunteers translated them into the required languages.

The students worked on the questions in groups in their native language, then one or more prepared a group report in English, often with the teacher's help. This was then posted on Edmodo or sent to the other schools via e-mail. In the case of the rural Chilean school where neither the teacher nor the students spoke any English, the teacher sent me the reports in Spanish and I translated them into English before posting them. We also had the assistance of the local coordinator of the *Inglés Abre Puertas* program in Chile to

help the teacher and students with translations. This use of volunteer translators had been highly recommended by IPY respondents, and was invaluable in this project.

In addition, the teachers helped as translators or interpreters during web conferences. Students in the classes who had more advanced English skills also helped other students in their class and served as presenters in the videos and during the web conferences.

The project was also incorporated into English classes in the school in Greenland and one of the schools in Brazil, and both teachers and students made use of free online translation programs such as Google Translate and Babylon.

Technology. One of our major challenges was computer technology, both in terms of infrastructure and in the abilities and comfort level of the teachers and students to use the different technologies. Infrastructure problems included available bandwidth and Internet speed, and sometimes even Internet access. This was particularly true with the small rural school in Chile and, unfortunately, resulted in that school dropping out of the project after the first three months because they lost their Internet connection for most of the school year.

Another problem was that many Internet programs are not allowed in Greenland schools because of the high cost of using the Internet. This includes any social networking sites such as Facebook or Skype, any mass storage sites like Dropbox, and the use of the Internet to watch videos. This made it difficult to share large files such as videos.

We used a program called Edmodo for the exchange of photos and information among the schools. This is a web-based platform that looks and works like Facebook, but was developed specifically for educational use, so its use was allowed in the Greenland schools. Edmodo was available in English, Spanish, and Brazilian Portuguese, but not in

Danish or Greenlandic. This put the students in Greenland at somewhat of a disadvantage because they had to work in English when using the program. Some of the students were competent enough in English that it was not a problem for them, while others needed help. The students with a better command of English helped the others voluntarily.

When we wanted to have Skype calls among the teachers, or upload or download large files such as videos, the Greenland teacher did this from her home. When other technology was not available for whatever reason, we communicated through e-mail.

We also included several web conferences as part of the project. The Greenland teacher applied to the Ministry of Education and received a license for a web conferencing program, so she served as the host for web conferences. We had mixed success with this, due to a combination of factors related to either the technology or the weather, as exemplified by my field notes on our first attempt:

> K and I spent about an hour this morning testing the web conference software. The program in general worked fine, but the sound was a problem. There was a lot of static and I could hear my own voice after a slight pause every time that I spoke. At 2:00 pm, we gathered in the Grade 7 classroom with nine students who had volunteered to take part after school hours. We managed to connect with H's class in Brazil (17 students) by about 2:10. Their webcam didn't work, so we couldn't see them, although they could see us. We also had a problem with our microphone, which was built into our webcam. The only way they could hear us was if one person leaned right into the microphone and practically shouted.
>
> Three of the Brazilian students presented slides about Brazil in general – cities, beaches, Carnival, soccer, volleyball team. Periodically, we had to stop the student presenting so that K could translate into Danish for some of her students. According to K, about half of the students could understand most of the English

> spoken by the Brazilians, although one girl's accent made it difficult for any of us to understand completely. This was a time-consuming process, but I don't see any way around it, if we want to be inclusive of all students. I was pleased that some of K's students who speak basically no English were interested enough to volunteer to participate in this conference. *(author's field notes)*

Although we had problems with the technology, and ran out of time before we could discuss environmental issues, the web conference did raise the interest and enthusiasm among the Greenland students, as was illustrated by the classroom discussion the following day:

> K did a follow-up to the web conference by having the students who participated explain to the other students what had happened and what they had learned. She used a question and answer technique to see what the students remembered about the web conference. All of those who had participated had at least one comment. They mentioned the webcam, the problem with our microphone, Carnival, the volleyball team, the size of the cities, the beaches and the red roofs, and the problems with pollution in Brazil that had been mentioned briefly at the end of the conference. This discussion led the students into the next set of classroom science activities, which were related to learning about local pollution problems. *(author's field notes)*

Project Successes

Despite the challenges and frustrations, we noticed some positive outcomes even over the short time the project lasted. The learning was relevant to the students because it dealt with everyday realities and their local environment. It also helped raise awareness and interest in other countries, and increased the students' understanding and respect for

other cultures. Finally, it resulted in at least one example of information exchange that was of practical value.

Increased learning about local environments. Both the students and the teachers learned more about their local environment when preparing reports and presentations for the other schools. For example, the students in Greenland were asked what they would like the students in the other schools to know about their lives in Greenland. They decided they wanted to put a picture of an iceberg in their report. When I suggested that they also describe what an iceberg is, it turned out that they didn't know, despite the fact that they see icebergs in the local fjord on a regular basis in the winter. They knew that it was frozen water, but they assumed that it was just the ocean freezing.

An excerpt from my Greenland field notes illustrates some of the other learning, as well as potential misunderstandings, that occurred during the project:

> The students logged into the Edmodo SoP student group and looked at what E had posted about Brazil. K asked her students what they thought other students should know or would like to know about Greenland. Their first response was that they don't live in igloos and don't have polar bears as pets. They started writing, and then K asked them where their electricity comes from. This took quite a bit of discussion before they determined it was from water (hydropower). One student then wrote "We live a normal life." K reminded him that what is normal for him might not be normal for others. He wanted to change it to "We live almost like you." I asked him if he knew how the others lived and he admitted that he didn't. At K's suggestion, he deleted it. *(author's field notes)*

One of the Brazilian teachers e-mailed me later commenting on the Greenland students' Edmodo post. She said that her students found it funny and wondered if the Greenland students were trying to be "hilarious" when they said that they didn't live in

igloos and didn't keep polar bears as pets. The Brazilian students finally decided that the Greenlanders were trying to be funny. When I talked with the Greenland teacher about this, she told me that her students were not trying to be funny. Apparently, when they travel to Denmark or other parts of Europe, these are common questions they get from other children. This demonstrated the possibility of miscommunication based on what we perceive as "normal" – the Brazilian students couldn't conceive of someone actually believing that Greenlanders keep polar bears as pets, so they dismissed the Greenland students' comments as an attempt at humour.

This example also underscored the importance of the human connection in environmental communication – it is difficult to discuss issues of importance until a relationship has been established and participants have learned to question their ideas of what is "normal" or "usual." It requires an understanding and acceptance that what is considered normal in one culture may be completely different in another. This may be in terms of humour, religious beliefs or political views, but it may also be as seemingly simple as concepts of "warm" and "cold" or "rainy" and "dry." The project focus questions started the students thinking more about these concepts and the environment they experience on a daily basis, as they began a study of weather and climate. In my field notes I wrote:

> K introduced the first SoP questions for discussion. She read the one asking them to describe the local ecosystem. None of the kids had ever heard the word "ecosystem," so she put up a diagram and described it. She talked them through it with questions, recording and discussing their responses. Then she went back to the SoP questions, starting with weather and climate. The first question was: How hot and how cold does it get where you live? The students didn't know, so K put

> up a yearly average temperature graph on the SmartBoard and they discussed it. *(author's field notes)*

The focus questions seemed to be quite successful in engaging the students in active learning:

> The students were divided into groups and instructed to work on the five weather and climate questions. On Thursday, one student from each group will present a one- to two-minute summary in English and P will videotape them. The videos will be posted in K's folder on Edmodo so other schools can see them. One small group of boys will work with a Greenlandic teacher and do theirs in Greenlandic as they are not comfortable with Danish. The kids dispersed to computers and started their research. For the most part, they seemed to be interested and focused on the task. I think one draw may be the video presentation on Thursday. K went from group to group, and I heard her discussing the seasons with one group. Towards the end of class, the focus waned and there was more fooling around, but they did keep working on the task. P said that there were some kids who wanted to keep working on it over the break. *(author's field notes)*

The learning in this case was not restricted to the students. The teacher also improved her own understanding about the science she was teaching:

> After the class, K told me she had been surprised that none of the children knew when the seasons changed. When we discussed it, it became apparent that she was working on the traditional Danish (temperate latitudes) concept of four seasons, lasting three months each. P and I pointed out that it depended on how you define "season," and that it would vary greatly with latitude and other geographic factors, and that the concept of seasons would be very different in Malaysia or Greenland than it would be in Denmark. *(author's field notes)*

In a similar vein, the Brazilian teacher told me that both she and her students had discovered issues related to mining in their community that they had not been aware of before they prepared a presentation for a web conference with the Greenland school.

The teachers also learned more about their students. The Greenland teacher commented to me several times during the project that she had assumed that her students knew many things that, over the course of the study, it became apparent that they didn't. For example, she was surprised that her students didn't have a better understanding of the environmental problems that Greenland faces. This was one of the unexpected (at least by me) results of the focus questions we developed for SoP. They not only made the students think about their own environment; they also caused the teachers to re-examine their assumptions about what their students know or understand.

Increased understanding of other countries and respect for other cultures. According to reports from the teachers, the project also increased the students' interest in learning about other countries and cultures. The teacher in Greenland told me that there was a lot of discussion among her students about the fact that the Malaysian children had never seen snow or been able to go sledding or snowboarding. The Greenland students also talked about what the Malaysians have that they themselves don't (e.g., trees), and what they have that the Malaysians don't (e.g., snow).

It was important to the students to find common interests with each other, and they wanted to know about everyday life for the children in the other countries. Once they had made this connection, it was easier for them to move on to discussing environmental issues. This was demonstrated clearly in a web conference that the Greenland students had with one of the Malaysian students. The following description is from my field notes:

> We finally connected with Fatin around 9:15 a.m. Greenland time. She was alone and said that she hadn't been able to contact her friends. Everything was very

awkward at first because the students weren't comfortable asking their questions, even though they had written them down ahead of time. The microphone was passed back and forth among them for a while before one student finally asked a question.

The first questions were a bit stilted: How many computers do you have at your school? Do you have mountains? Do you have school buses? Fatin was very composed, had very good English and answered their questions quite well.

Then the conversation got a little better because one boy started talking with Fatin about how people travel around Greenland (no trains, most people own a boat, etc.). Another boy read his question asking what the Malaysians do when they get floods. Fatin said that there is a rescue service that comes around in boats and takes people to a shelter until the flood waters recede. That got them talking about the weather, especially snow in Greenland. One boy mentioned that they like to have snowball fights and then had to explain to Fatin what that meant. She said she had only seen it on TV.

One Greenland student then asked, "What do you do in your free time?" Fatin said that she likes to play music using traditional instruments. When the students asked her what instrument, she replied "the gamelan." One of the boys told Fatin that they have traditional drum dances in Greenland. A couple of students immediately left the room to get a drum. Then one girl stood on a desk and demonstrated in front of the webcam. Fatin asked what the words meant, but the students and K said that they weren't really words, just sounds. K also said that the men and the women make different sounds when playing the drum. Fatin asked what the men sounded like. This started quite a conversation in the class. Apparently there are several different versions, and the original girl demonstrated

> one of them to everybody's amusement. The Greenland students wanted to hear the gamelan music, but Fatin explained that she was at home and all the instruments were at school.
>
> Fatin then asked if they had trees and other plants in Greenland. The kids explained that there were no trees but that they had a lot of very pretty flowers (the girl saying this had trouble coming up with the word "flowers" but others helped her).
>
> At this point, the hour was up so K asked Fatin if they could talk again next week at the same time and said that her students could show some pictures of the plants and flowers around Nuuk. Fatin agreed and said that she would tell her friends about today's talk and what she had learned about Greenland. She said she would try to get some of them to attend next week's web conference and asked if the others could also do it from home. I assured her that they could log in from home just like she did. *(end of author's field notes)*

At the end of the project, one teacher commented that the students could have gained the same information from the Internet, but that it was more personal and more "real" because they learned it from a student living in another country:

> I think it's more motivating for the students to know that they're actually writing to some students somewhere else in the world and getting the response directly, instead of just searching on the Internet. 'Cause you could get the same answers from the Internet, but I think it's more motivating to do it when you actually have someone on the other end. And I think that my students, comparing with the ones in Brazil, could learn quite a lot and just, like we talked about with the mining. With the pollution from the mining, that they are seeing that it's a problem. And I'm really, really hoping that could open the eyes, my students' eyes to some of

> the consequences that will happen if the mining is opened. Yeah. Instead of just saying, "Oh well, that's good, 'cause then we get money." *(NNES respondent)*

Her comments reflected what other researchers have noted in similar projects. O'Dowd (2003), when talking about an e-mail exchange project between classes in Spain and Britain, noted that students tended to be more interested in learning about other cultures and have a more positive attitude after they received responses from their e-mail partners in the other country. Similarly, James and Bixler (2008) noted in their study of children at a residential environmental education camp that "social interaction, previous knowledge or experiences, and culture act as filters for what becomes meaningful for a child participating in a new experience" (p. 45).

Practical information exchange. In one case, information shared by a school in Chile was of practical benefit to the Greenland school. Both towns are often subject to very strong winds. The students in Chile reported that their town puts up guide ropes for people to hold onto when they are walking in town during strong winds. Just after they shared this information, a Greenland student was injured by being knocked down by the wind when getting off the bus at the school. Now, the school puts up guide ropes from the bus stop to the school door on windy days.

In addition, as a direct result of their communication with students in Malaysia, the Greenland class planned and carried out a two-week field trip to Malaysia in May 2015, where they participated in an environmental camp with Malaysian students. After the school administration gave permission, a parents' committee was formed and parents and students spent the next two years fund-raising for the trip. Two of the students also worked with Greenland Radio to film and narrate a video program about the trip and about Malaysia's natural environment. After editing, the video will be shown of Greenland's national television channel.

Summary

Despite its limitations and its short timeframe, the SoP experience appeared to support many of the points that were made by the IPY respondents about ways to improve international communication, especially when working with schools and children. These included the importance of developing personal relationships and attitudes of respect, making the issues personally relevant to increase engagement, increasing participants' awareness of different world views, providing materials in native languages, and the use of volunteers to lend support.

As the focus questions dealt with the local environment and were relevant, many of the students became engaged and interested in the project. This helped them learn more about their own environment and led to a greater interest in other countries and cultures, and an awareness of shared environmental problems such as pollution. It also encouraged the students to reflect and to question what they thought of as "normal," both in terms of culture and the physical environment.

The use of teachers, advanced students, and other volunteers to translate questions and written exchanges, and serve as interpreters in web conferences between the classes, engaged more people in the project. This, and the fact that they could work through the initial questions in their native language, helped ensure that people were not excluded because of language.

We also learned a few important lessons during the project that could help improve future initiatives of this type:

A clear project design and mutual expectations are necessary. The SoP project was initiated through numerous discussions among key IPY EOC participants. These people were instrumental in identifying teachers and schools to participate but, in most

cases, they themselves did not actually take part. It would have been helpful if we had had more discussion sessions among the participating teachers before starting in order to ascertain that we all had the same understanding about what we were doing and how the project would function. This could also have helped us adapt the project better to individual school systems and link the activities to the required curriculum, another factor that had been identified as important by IPY respondents.

This lack of mutual understanding was most evident in the case of Malaysia, where the teacher did not take part in any of the discussions after my initial meeting with her and her class. She responded to a few e-mails I sent to her personally, but left most of the project coordination to one of her students. Although that student was enthusiastic and kept up a steady exchange with the class in Greenland, it was not clear how many other Malaysian students participated actively in the project.

Facilitator training is important. We were heavily dependent on computer technology in all stages of the project, and some of this technology was new to one or more of us. For example, even though Edmodo is similar to Facebook, we had some issues learning how to use it. Early in the project I wrote in my field notes:

> J also sent a Dropbox link for the school's introductory video, so I added that to a new Edmodo folder. I'm not sure if people can access it though because the school here blocks access to Dropbox because it is an "online storage site." I need to move the other video links to that folder as well, because they are now buried at the bottom of all the posts and almost impossible to find. Another weak point of the Edmodo system is that apparently I, as the group "owner," am the only one who can add files or links to the existing group folders. K tried to add a PDF story to the Greenland folder but we couldn't figure out how to do it from her computer when she was logged in. Apparently she needs to create a folder in her personal

> library and then share it with the groups. I figured out later that the links to Dropbox don't work from Edmodo. Apparently the only way to get them to the others is for the creator of the Dropbox file or folder to send a separate e-mail message with the link "shared" directly from Dropbox to each recipient. *(author's field notes)*

Problems and frustrations such as this might have been avoided if we had built in some kind of training sessions before the start of the project. We were, however, limited by the fact that we were all working on this on a volunteer basis and had limited time and no funding of any kind.

Developing awareness and respect takes time. It took longer than anticipated to get started on the environmental learning part of the project. There were a number of reasons for this, such as class schedules and limited time, but a main factor was that the children wanted to get to know each other as people first before they were interested in sharing ideas about the environment and environmental problems. They were interested in what the other schools looked like, how the students dressed and why they dressed as they did, and what they did for fun.

The common factor that got the students talking about the environment was the weather. This made them start to question ideas about what is normal, and what is meant by "hot" and "cold" as they compared extreme temperatures in the different countries. From there, it was easier to start to address environmental challenges.

This is not unique to children and, in fact, reflects similar findings from international business research. In her investigations into the importance of "small talk" and rapport on international business communication, Pullen (2010) observed that "knowing an individual as a multifaceted person could be very important in adopting a flexible approach to communicating with the person and avoiding unnecessary

disagreements or misunderstandings" (p. 470). Exposing children to this type of international exchange on a regular basis from an early age could help them develop valuable interpersonal skills that will be useful for them in their future careers, whether in business, research, or other fields.

Some factors can't be controlled. We also learned that patience is necessary, and despite our best efforts, some things were out of our control. Our greatest problem stemmed from a combination of computer technology and the weather which caused several web conferences to fail. In one case thunderstorms and heavy rains cut the electricity and flooded the school in Brazil the day before a planned conference. Twice the conferences were cancelled because of storms in Greenland that affected web connectivity, and once the school in Chile was flooded and was closed for several days. Even these events, however, became opportunities for additional learning as they gave the teachers and students the chance to compare and contrast extreme weather and its impacts in the different locations.

Chapter 6: Finding Common Ground

The previous two chapters examined a specific program (IPY) and a related project (SoP) that required communication and collaboration across cultural and linguistic boundaries. It identified issues faced by the participants, explored how they felt about the issues, and investigated ways in which they worked to resolve them. This chapter synthesises those findings and considers some of the broader implications for international communication.

The interviews for IPY included individuals from 16 different countries. During the second stage (SoP), I interviewed another 21 people from five different countries. In addition to those interviews, over the course of the research, I collected supplementary data through an additional five interviews with teachers and headmasters of schools in Iceland, and 14 interviews and a focus group discussion with polar researchers in Argentina. A list of all formal respondents is shown in Appendix 1.

As part of my research, I also attended two international conferences: one related to international collaboration (the 4th ACM International Conference on Intercultural Collaboration, Bangalore, India) and the other focused on environmental education (World Environmental Education Congress [WEEC], Marrakech, Morocco). WEEC was of particular interest because it was attended by approximately 2,400 educators from more than 150 countries. It was conducted in four official languages – Arabic, English, French, and Spanish – and presenters could use the language of their choice. Simultaneous translation was not used at any time other than for the keynote presentations. I was able to gather more data relevant to my research through observations of participants' interactions during this conference as well as from informal conversations about the issues with people from different linguistic backgrounds. In addition, my two presentations generated lively discussions about practical methods to

approach this type of communication. Insights gathered from these observations and conversations are also considered in the overall synthesis in this chapter.

The specific circumstances – for example, native language, culture, age, and professional background – varied substantially among the participants in the different programs, interviews, and conferences. Nevertheless, I was able to identify a number of general concepts related to improving communication and collaboration that were common to most people. In this chapter, I review this common ground, summarise the key issues, and offer some suggestions for their resolution.

Advantages and Disadvantages of a Lingua Franca

All of my interview respondents agreed that a common language is necessary in today's globalised world. Many people expressed the opinion that it doesn't really matter which language fills the role, just that we need a lingua franca. As one European respondent said:

> We all need a sort of common base to work from. So whether we chose Chinese or English, there needs to be sort of a common denominator with which we all work. And it wouldn't matter which language you chose; it would always lean towards being an advantage for one versus another. *(NNES respondent)*

A Brazilian respondent expressed similar sentiments in the written survey:

> We need an international language and some years ago the English was chosen to be the one. I have no problem with this. Of course if it was Spanish, it would be easier, but if it was German it would be more difficult, so it's just OK. *(NNES respondent)*

Most people took a practical view towards the fact that English is already spoken by a large number of people around the world, and that it enables people to learn about

the wider world and to contribute towards a global knowledge bank. As one Chilean teacher said:

> We need a language that will allow us to know what is happening in the world and not just in our space. Many times we need to start with this. From our space, then know the world. And the technology, and all that, now allows us to arrive at this, to know more beyond our borders. And also for us to contribute. Because a lot happens that, for example here in Chile, I have the perception that we are very capable of contributing to the world knowledge but we don't have the capacity. And learning English would help us gain the capacity to share. *(NNES respondent, author's translation)*

This pragmatism echoes the findings of Garrett (2010) in his study of university students' perceptions of the role of English in Australia, China, Japan, New Zealand, the UK and the US. He commented that the students spoke about English either "just as 'English' or in its role of principal lingua franca" (p. 465) and, generally speaking, did not appear to view the English language as a threat to themselves or their culture.

Some academics in my interviews did express concern that the dominant use of English biases things towards a "Western" or "American" point of view (with the two terms often used interchangeably). One Chilean researcher voiced his ambivalent feelings about this:

> English is in third place in terms of the quantity, the number of speakers. Nevertheless, it's in first place in terms of domination of power. That is not very good. But it is good that there is a channel of communication. English is very good, let's say, if you can't speak in your native language, it is a universal form of language. Also, however, it's not good that it is English now, since it is the third language. Not very democratic. *(NNES respondent, author's translation)*

The concerns expressed by the respondents about unequal power relations echo the findings of many critical theorists (e.g., Durand, 2006; Pennycook, 2010; Phillipson, 2011; Phillipson & Skutnabb-Kangas, 2013). For my respondents, however, these concerns took second place to a general recognition of the practical need for a lingua franca. To explore this issue further, I asked respondents what they felt were the major advantages and disadvantages of having English as the principal international language.

Positive aspects of English as an international language. People's perceptions of the positive aspects of English as an international language centred mostly on general issues of practicality related to a lingua franca, rather than on English per se. The most often mentioned positive aspects were that English is already widely spoken around the world and that it allows people from different countries to communicate directly with one another. As one respondent from Europe said:

> What's positive is, OK, I can go to a conference in Oslo and share my experience with let's say the Portuguese or teachers coming from Brazil or Netherlands. I mean the positive aspect is really huge. *(NNES respondent)*

An Icelandic respondent commented that English is a good choice when working with people from other NNES countries because it helps keep people on an equal footing:

> I have experience in working with the Nordic countries. … If we have a conference, and obviously language is Scandinavian, that means those from Denmark, Norway and Sweden, they understand one another quite fairly. But those from Finland and Iceland, they are not fluent. That means you are not active in the discussion. And that means, if you are not active in the discussion, you cannot influence the outcome of the discussion. And what I've been promoting is, well, let's all speak English. That means we are all equal. And those who have,

> who are speaking their mother tongue, they don't get the advantage of ruling the discussion. *(NNES respondent)*

One NNES respondent also felt that even though native English speakers might dominate the conversation in international talks, that wasn't necessarily completely negative because it could lead to increased learning on the part of others:

> But a good thing is that there, since they [NESs] dominate the talk too easy, the benefit for the others is that they actually learn something that they don't know. So they can somehow go forward with their own local knowledge. *(NNES respondent)*

The large number of resources available in English was also seen as a positive feature, or at least as a strong motivating factor for learning English, especially by respondents who had a science background. I also heard several responses that computer technology favours the use of English and that it is much easier to use computer programs in English. For example, one Icelandic respondent told me that the Icelandic version of Word was always behind the latest English one and that he found it confusing to use:

> Where the development is fast, for example in computer science, that means we use so many words in English and ... they have been translating the Windows environment in Icelandic and the Word program and Excel, trying to translate everything there and when I'm doing there, using the Icelandic words, I get completely lost. Because I don't know what is, I have to use sight memory to remember what means what. Because I only know the English terms. So, for me, I always prefer the English version. Not the Icelandic version. *(NNES respondent)*

Several respondents also said that English was a relatively easy language to learn, often easier than their native language, and that it has a large and precise vocabulary. As one Brazilian commented, "In my opinion, the English language is a very easy language

to learn. I'm saying so because I'm trying French, Spanish and Dutch." *(NNES written survey respondent)* Another added, "It is a very easy language to learn, with little grammatical complexity." *(NNES written survey respondent)* These comments came primarily from people who speak other Indo-European languages, so they might not hold true for speakers of more linguistically distant languages. Even for those speakers, however, access to the language was mentioned as a key factor in learning. A Greenlandic taxi driver with whom I spoke said that he found English easy to learn mostly because he had so many opportunities to hear the language through films, songs, television programs, and computer programs.

Negative aspects of English as an international language. The main negative factor noted by interview respondents was that the use of English excludes many people from participating or limits their participation in discussions. This is again an issue of the use of a lingua franca, rather than of English per se, and may occur whenever people have to work in a non-native language. A teacher in northern Greenland noticed this when she attended town meetings:

> When we've got a debate in the native language [Greenlandic] I see many of the people participating and many say something and give their opinion on the subject. But if it's held in Danish, a lot of them will hold back and not say nothing because they're not sure how to say it or they won't be as clear. And they will be, in a debate, that's really difficult because if you're not strong in your, what do you call that? opinion, or in your use of words, it can be … seen as a weakness or something. So, if you don't feel entirely certain of what you need to say to make your point clear, you might not say anything at all. *(NNES respondent)*

A Brazilian postgraduate student expressed similar sentiments. She told me that scholarships to attend an international conference were offered to postgraduate students

in her professional organisation, but the students chose not to apply for the funding because they all felt uncomfortable attending a conference or meeting where they would have to speak English.

This lack of confidence in expressing ideas or opinions in another language can lead to people becoming disengaged or uninterested in the activities or the topics under discussion (Pullin, 2010). One European respondent commented on this as a potential problem in the IPY EOC activities:

> By being an English-speaking country, your understanding is much quicker to understand the activities and their meaning because everything is in English, and that can turn people off from the other countries. *(NNES respondent)*

This not only excludes people from participating, but it may also limit information flow and dispersal in international settings. When people confine their interactions primarily to their own cultural or linguistic group, a phenomenon known in international business as "language clustering" (Mäkelä et al., 2006; Tange & Lauring, 2009), important knowledge may be restricted to a small group of people. This was particularly evident in the WEEC conference. Although the conference had four official languages, my observations and conversations with others indicated that most of the conference participants only attended those presentations that were in their own language or in a language with which they felt comfortable. Presentations in Arabic were a particular problem because few participants from non-Arabic speaking countries had any knowledge of the language.

Language clustering was also noticeable in the polar researchers' workshop that I attended in Brazil. Oral presentations were given in Portuguese, Spanish, and English, or in a combination of the three languages. Eight of the 14 Brazilian attendees who answered a written survey admitted that they did not attend any of the presentations that

were not in Portuguese. The tendency to avoid interactions in other languages was also evident in the behaviour of some of the Spanish speakers who got up and left the room whenever a presentation was being given in Portuguese. This behaviour suggests that the self-imposed linguistic isolationism in scientific research that was observed by Ammon (2006) is not confined to research publications; it is also noticeable in face-to-face situations such as professional conferences and meetings.

It was frequently mentioned in interviews and conversations that native speakers tended to dominate conversations and meetings, and that non-native speakers were often perceived as being less competent or less professional. This reinforces common findings reported by international business researchers (e.g., Ehrenreich, 2010; Tange, 2009; D. Welch et al., 2005), indicating that the issue is not restricted to the corporate world. An Italian respondent commented:

> But sometime the feeling that we have, I mean we in terms of Italians, teachers or scientists that go abroad and work with an international project. We have the feeling, sometimes, not very often fortunately, but that the differences in languages are used in everyday fight for the job. *(NNES respondent)*

A Malaysian respondent expressed similar feelings in a stronger way:

> If you, as a professional, if you speak Malay, people will think that, oh, she's not really good because she only know how to speak Malay and her English is not so good. Even though you have the knowledge, it's just like you are secondary to others. Not very clever, something like that. So if you use Bahasa Melayu, lower, lower standard. *(NNES respondent)*

This reinforces Durand's (2006) comment that, "It is difficult for anyone to be considered an expert when one does not sound like an expert, and proficiency in the language used is a necessary condition, albeit obviously not the only one" (p. 52).

However, her comments also highlighted another potential issue: It is not only the ability to communicate your ideas effectively that illustrates your professionalism; it is also the language in which you do it. She felt that English had a higher level of prestige, and made the message sound more important, even within Malaysian society. This sentiment was echoed by several other Malaysian respondents.

Another negative aspect that was mentioned several times was the amount of time it takes for a non-native speaker to read or translate English-language materials. Issues of time were also frequently alluded to in comments about difficulties in keeping up with what was happening in meetings or during conference presentations when they were in English. This was seen as especially problematic during informal discussions in social settings, which are an important part of professional networking. This again echoes findings from international business studies where respondents have noted that the technical terminology is not a problem, but that it is much more difficult for them to express themselves effectively during "everyday" conversations because it takes time to think of the right vocabulary and they are not confident of their abilities to express their opinions or to understand nuances of the language (Charles, 2006).

Strategies for Success

The key strategies for overcoming the negative aspects of the use of a lingua franca and promoting successful international communication that emerged from my interviews, conversations, and observations can be grouped into three broad categories: building relationships, negotiating meaning, and promoting equity and inclusivity. I discuss these in more detail in this section.

Building relationships	Negotiating meaning	Promoting equity and inclusivity
Improve cultural awareness by learning to question what is "normal."	Remember that the main point is to understand each other.	Promote respect, open-mindedness, and awareness in native English speakers of the difficulties faced by non-native speakers.
Focus on similarities rather than differences.	Don't be afraid to combine languages (code mixing and code switching).	Adjust pace of meetings and conversations, and allow for "wait time."
Collaborate with someone who is native to the country in which you are trying to work and with whom you have a common language.	Explore and compare key words and concepts in various languages.	Encourage native English speakers to learn a second language.
Develop a strong local network.	Take advantage of computer technology such as online translators and social media.	Include alternatives to written or spoken language such as the use of realia, maps, illustrations, art, music and drama.

Figure 6. Recommendations for success in coss-linguistic communication

Building relationships. We noticed in the SoP project that the children wanted to get to know each other as individuals before discussing environmental issues. They wanted to know what life was like for each other and what they had in common, as well as how they were different. In my experience, adults are no different. We need to build relationships with each other before we can work together effectively and make sure that we are involved in a reciprocal process rather than trying to impose an unwanted environmental project or our own viewpoints.

A French polar researcher I interviewed made similar observations. She was doing educational outreach at a settlement school in northern Greenland, and had connected the school with two schools in her home village in France. She described how excited the Greenlandic students became when, during a Skype video conference, they discovered that they shared similar tastes in popular music with the French children:

> What was interesting, the main exchange was about the culture. They didn't speak much about science. … At that time there was a big international hit in music, "Going out of style." One boy had a shirt with the name of the band and the other

> students were "Oh!" and so he put on the music. The Greenlandic children started to dance and on the other side the 60 French children danced also, on the same music. That was quite funny because they had fun all together being thousands of kilometres away and that, I think, caused them also to realise that they are not so different from each other. *(NNES respondent)*

Respondents in my study also used or suggested a number of other strategies to help build and maintain the productive relationships necessary for successful collaboration:

Learn to question what is "normal." Gärdenfors (2007) observed that we perceive patterns in our world that we commonly recognise as "normal," and suggested that "it takes an interaction and sometimes a clash with another culture to realize that certain patterns are not universal" (pp. 71-72). A teacher who worked in a small settlement school in the north of Greenland illustrated this point when he spoke about his experience with some Dutch journalists who visited the school:

> We had some journalists come that wanted to talk to the students about global warming. And they were taking their Dutch ideas, and of course Holland is very concerned about rising water levels. The kids here aren't that concerned. Because Greenland's doing OK. Their fathers are experiencing problems with global warming in terms of how it's affecting the ice, and of course it's more difficult and more dangerous if the fishing season is extended into the more stormy period of time. But the journalists would say things like, "Well, in Holland we have what we call a sweater day. And we save on the energy we use by turning off the heat in the school that day and putting on an extra layer of clothes. Could you do that here?" And the children just looked at them as if they were from another planet, and they had to have the teacher step in and say, "Look, if we turn the heating off

> now, the pipes would freeze and we wouldn't get it fixed before summer." It was that kind of thing; we met that so much, so often. *(NES respondent)*

To develop the recognition that cultural patterns and perceptions are variable requires having some kind of contact with people in other cultures. A Danish teacher who was working in Greenland spoke about how spending extended time in another culture had widened her perspectives, and helped her overcome a tendency to stereotype people:

> I'm really happy that I had this opportunity to come to Greenland and experience the Greenlandic culture because my opinion of Greenlandic people, before this experience, was that they were just keeping to themselves and didn't want anything to do with anybody. They would keep quiet and just, I never had any contact with Greenlandic people in Denmark. So I just stereotyped them as being loners. All of them. And after being here, I can see why. And it's not because they just don't want to, it's because they're not used to this upfront, really social communication. They're not used to using a lot of words just to be close to somebody. They are happy just sitting next to each other. If I don't have something important to say, I don't need to say anything. And they are happy in each other's company just sitting there like that. And that was an eye-opening experience for me because I'm used to, silence in a crowd means that we are not having a good time. If nobody is telling a story, I need to because then there will be no silence. I have to fill the silence. And they're really happy in each other's company just being silent. So that was really, really tough for me. *(NNES respondent)*

She went on to say that:

> Many Danish people expect every culture to be exactly like our own because we think that's the right way. We don't give it a second thought why people's lives are like the Greenlandic people, for example. We just think, "They're weird." *(NNES respondent)*

Unfortunately, not everyone has the opportunity or the means to travel and experience other cultures first hand. A teacher in Chile pointed out the potential value of computer technology in broadening children's perspectives by making connections, even if they are "virtual" connections, with children in other parts of the world:

> Have virtual conferences, virtual seminars, even virtual meetings. Contact with similar schools. Here, for example, there is my school that is dedicated to everything that is related to planting, nature trails. … There may be another rural school, maybe in the United States, perhaps in another country where they speak Spanish – again we have the language issue. It can be a similar school where the students can communicate through e-mail or chat sessions. They can be in contact on such-and-such a day at this hour. Right? … My issue with language is that we have to be in contact with someone who speaks the same language. But by using the Internet, you can achieve it. It is also a journey; it is a form of moving yourself to another location virtually. It helps the children enormously to know that, in other places, students are doing the same as they do in their own school. Or if it isn't the same, they can collaborate, right, with suggestions. *(NNES respondent, author's translation)*

An IPY respondent had another suggestion for "virtual" ways to promote a broader understanding of how people from different countries understand the world and view issues such as climate change:

> From my own experience, it is very good to have, for example, a national or local television program with the subject you want to be on the international discussion level and just have subtitled that and see if you understand how people think about it and how they communicate about it. Just looking at, for example, a television program from Brazil, from Malaysia, from New Zealand, from Russia, from Canada, and the States, about the same issues. People discussing [the issue] or a documentary, you know that kind of stuff. You will be able to understand better before you have an international discussion about it because then there is a kind of localisation about why, who. … I always find it very useful to have bits and pieces of documentary. But then from different perspectives from countries. In their language, with just subtitles in English. *(NNES respondent)*

When you start to interact with other cultures and reflect on what is considered "normal," and realise that there are multiple perspectives and multiple world views, you can become more sensitive to subtle cultural differences that may help improve your skills in building productive, lasting relationships. These observations may be as simple as knowing how to address someone appropriately, as noted by one IPY respondent:

> You had to be very sensitive to someone's background, their culture, because you may respond to someone, you know, in one way. A very straightforward example is when I was talking to someone in Germany, for example, I would have to be quite formal. However talking to someone in Spanish, it would be very informal. *(NES respondent)*

In other cases, the differences may be more complex and involve potentially sensitive issues. Differences in religious beliefs, for example, may impact discussions about the causes of various environmental problems or opinions about who has the ultimate responsibility for their resolution. This requires development of a deeper

understanding of the cultures and customs of the people involved and a close connection with people from that culture.

Focus on similarities. When dealing with sensitive issues, it helps to determine common interests and needs and work from there, rather than focusing on differences of opinion. If you focus on cultural differences when working inter-culturally, you run the risk of alienating the other person or people to the point where they will not be interested in trying to communicate with you at all. This means that you need to learn about and understand (at least to a basic extent, since you can never completely understand a culture other than your own) the culture in which you are working.

In Malaysia, I was working mostly with Muslim Malays. Their perspectives on the creation of the Earth and the role of human beings were quite different from mine, but we shared a desire to help protect and improve the environment. This gave us the common ground to move forward together. Religious and philosophical differences of opinion were left out of the equation. As one Malaysian respondent put it:

> I strongly believe that there must be some international collaboration, even regional for a start. When we had this haze problem, somebody next door burns the rubbish and the haze affect us. It's the same thing if it's the other way around, you know. So let's talk together. How control it. Because it affects them; it affects us. Right? *(NNES respondent)*

Another expressed similar sentiments:

> My personal feeling is, if you want to get the best out of regional or cross-country, we have to have a common platform, so that what's happening in the other region is also happening here. Maybe you also have to be in other regions, other countries, which have a common. Then you can speak in a common language with effect. Maybe only the area is different. The site is different. But the denominator

> is the same. Yeah, for example, if we are talking about climate change for example, uh, weather. The frequent, what do we say? The frequent dramatic weather patterns, which is happening. So if you put that as a common denominator, you can have examples almost all countries of the region, and also the world. *(NNES respondent)*

The same respondent also recognised that environmental problems can be controversial, especially considering causes and deciding who is responsible for their resolution, and that care was needed to avoid increasing tensions between countries or cultures:

> We still have to have some common element to discuss and to talk. Which is far better than the, what do you say, confrontational approach, you know. I think that cross-border, definitely, there are many issues that can be very negative, can be very confrontational. But if you put the same denominator thing that this is also affecting you, you are affecting us, and you also experience this, you experience this. We may not have working experience in that for the neighbouring countries but, technically, if there are common denominators, we can communicate with each other in any language, and even through art … *(NNES respondent)*

I received similar responses from the people I spoke with in Chile. One teacher also pointed out that starting by identifying local issues and then expanding to a broader perspective can also help children understand and appreciate their potential role as active citizens:

> As human beings we have things in common. In the environment of limits and boundaries, I think that this is important. What we have in common can be the nexus to arrive at this communication that we need. … Perhaps starting with what we see happening in our locality can be the initial point for the connection with what is happening on a more national or international level. We, each one of us in

> our space, know what is happening up to a certain point, a certain level. But there is always more to learn. Precisely because we are preoccupied with our own things we don't see what is really happening. And we don't have a consciousness of what we do or don't do; for example, how we protect or are affecting the environment. We don't have this consciousness. Therefore, I think that we should start with the local first, with that theme, and later we can expand it to a more global theme. *(NNES respondent, author's translation)*

Collaborate with someone who is native to the country in which you are trying to work and with whom you have a common language. I could not have done any of the second stage of the research without close personal connections with key people in each of the countries. These people helped me develop a better understanding of both the language issues involved and the cultures in which I was working. They also opened many doors by increasing my acceptance in the communities, and helping me gain greater insight into the issues I was researching. A Malaysian colleague expressed this well when she said:

> Some people are more reserved with people outside our own culture. For example, maybe different races, maybe different religion. So they make some reserve when talking. I mean, they are not expressing fully. I mean they don't want to tell everything to other races, to other people. So if they are talking to me, they trust me better than talking to you. *(NNES respondent)*

Close connections with local people also help you understand the political and social systems specific to the country or culture with which you are working. Without this understanding, collaborative projects may founder because the communications don't involve the appropriate people. In Iceland, for example, a school headmaster talked to me about the challenge of including climate change education in the schools in his country:

> It takes time. You must know whom to contact. Because, well, if it comes to the Ministry of Environment, that must go to the Ministry of Education, and the Ministry of Education to the municipalities, and the municipalities to the head teachers, and the head teachers to the teachers, and from that to the students. So it's a long way. And, if information gets to … a person that is not aware of how to deliver it, in which hands to put it, it probably will meet a dead end. … You must know the way and the system in each country to be able to send it in the right direction. *(NNES respondent)*

As De Swaan (2010) pointed out in his concept of language systems, local people who are bilingual or multilingual can serve also as conduits to spread international information at the local level and encourage multilateral communication in this way. My Malaysian colleague commented, "We need a leader for this, someone who can communicate in English with the English counterpart and bring this message in Bahasa Melayu to the Malaysian." *(NNES respondent)*

A Greenland teacher also felt that this could be a valuable strategy in promoting environmental education about issues such as climate change. She emphasised the importance of local leadership and local ownership of projects or issues, especially in a place like Greenland, which was under colonial rule until fairly recently:

> Try to get some locals to actually commit to a project like that and then to be the communicators of it. And so, trying to get some local people interested in the project and then trying to educate them and to have them educate others. Or to have them talk about things, so that it actually comes from local people instead of other people coming here telling you this is how it is and this is how you're supposed to behave and "Stop doing this" and "Stop doing that." … Because then it's foreigners coming in and telling other people how to behave. And they're used

> to that because Danes have done it forever. And that, of course, makes it hard. That makes it difficult for people to actually take it in and to see that it's something that might need to be changed. *(NNES respondent)*

The success of environmental initiatives or environmental education dealing with global or regional issues can be enhanced by developing and maintaining good relationships with concerned local people, including some who are bilingual or multilingual. These people are key in identifying the issues that are important to the community and serving as multi-directional conduits of information. This will help ensure that it is a true collaboration and sharing of knowledge, and not a project that is imposed from the outside by "experts."

Develop a strong local network. For long term effectiveness, it is also important to develop a strong network within each country, rather than relying on one or two people. This was something noted as problematic in both the SoP project and IPY. For example, two of our planned SoP web conferences were cancelled at the last minute because one of the teachers got sick, and there was no one to replace her. One of the schools in Chile also dropped out of the project because the teacher's school duties were changed partway through the year. Although the school later re-joined the project, they missed out on several months of participation.

In IPY EOC work, our success in different countries depended greatly on the extent and strength of the local networks we had developed. This was illustrated by the case of China's involvement, as one respondent pointed out:

> We got them [local contacts in China] with our Changing Earth Day and that had a huge impact in China. I mean they got loads of schools involved in that, but as I said, we had that one contact and after the day and the Olympics, it just went dead. We found it very difficult to get that contact back. So you do rely on your one or

> two contacts very heavily within the various countries. … if they disappeared it was quite difficult to get another one, ‘cause it had taken quite a long time to get that one person in the first place. *(NES respondent)*

As discussed in Chapter 3, local networks were also identified by IPY respondents as being critical for the translation of educational materials into relevant languages as well as for their distribution to local schools and to the public.

Negotiating meaning. In order to build the necessary personal relationships and networks, we must be able to understand each other. Meaning is not something intrinsic in words, sentences, or actions. It is something that has to be created through shared points of contact and mutual negotiation. In addition to the need for respect, open-mindedness and awareness of potential difficulties faced by non-native speakers, there are other strategies that can help in the process of reaching a mutual understanding.

Don’t be afraid to combine languages. A major aspect of communication in another language is to realise that reaching a mutual understanding is the goal of communication (Harvey & Griffith, 2002; Jandt, 2003; Jenkins, 2007; Mäkelä et al., 2006), rather than the ability to use correct grammar and spelling. This may mean drawing on more than one language to reach understanding. One IPY respondent related an experience she had:

> I distinctly remember speaking with this woman that runs this magazine. I began to speak in French, and it’s funny because she was trying to speak to me in English. And at one point, we agreed that, because she felt that she was doing a poor job and I felt I was doing a poor job, we agreed that we would each speak in our own languages, but we understood each other. She would speak to me in French; I would respond to her in English. So we understood each other, but we

> kind of agreed on this way of navigating through our conversation. *(NES respondent)*

Sometimes meaning may be co-constructed through multilingual discussions. In Greenland, for example, I was interviewing a Greenlandic teacher (N). N was not confident with her English, so a Danish teacher (T) served as an interpreter. N and T both spoke fluent Danish, and T was relatively fluent in English. I started with questions in English. At the beginning of the interview with the more basic questions, N replied in English. Her English at that level was very good and her pronunciation was excellent so I had no trouble understanding her. With the more complex questions, she asked T in Danish for confirmation about what I had asked, and then replied mostly in Danish. T would then summarise in English. It was not a word-for-word translation because T didn't have the expertise as an interpreter or the level of English needed to translate verbatim. Still, we worked at it until we reached an understanding. Sometimes, N would correct T or add something else when T was telling me in English what N had said. If T was having trouble finding the right words in English, I used a questioning technique to make sure I understood what was meant. This continuous feedback mechanism helped us avoid misunderstandings.

Explore key words and concepts in various languages. There may be subtle differences in the interpretation of a given word or phrase, depending on the language used, or the cultural or professional backgrounds of the people involved in a discussion. After my presentation to a group of polar researchers in Argentina, one person disputed my use of the word "resource" (*recurso* in Spanish) when I said that Antarctica was a resource for the common good and "belonged" to everyone. I was speaking in English, but had the words on my slide in Spanish: *La Antártida es un recurso para el bien común y "pertenece" a todos.* He argued that I should have used the term *un bien* rather than *un*

recurso. A lengthy bilingual discussion followed among the audience. Some felt that the term had a slightly different meaning in English than it did in Spanish and that it might be appropriate in English but not in Spanish. Others varied according to their particular area of research. Most of the glaciologists, biologists, and other natural scientists didn't feel that the word was a particular problem; while the political scientists were in general agreement that *recurso* was not appropriate because it implied something that humans were going to exploit. We didn't really reach a consensus about it in this instance. In a different setting, however, such as when an international group is working on a joint project, taking the time to discuss the deeper meaning and implications of key words in this manner would be a good way of challenging everyone's assumptions that others perceive and understand things in the same way we do, which we often take for granted without much thought, and make it easier to negotiate an understanding that allows for multiple perspectives.

Take advantage of computer technology. Online translation programs can be useful learning and awareness-raising tools for people who speak more than one language at a reasonable level of fluency. Native speakers (of English or other languages) often use idiomatic expressions and complicated grammatical structures that can be difficult for non-native speakers to understand. After experimenting with online translators, I discovered that if I wrote what I wanted to say in English and then translated it into Spanish or French using a program such as Google Translate or Babylon, some things didn't make sense when translated, or at least didn't translate well. I found that rewording my sentences and translating them again had the effect of making me think about simple, straightforward ways of saying what I wanted to say, so I became more aware of the potential ways in which my speech might be misunderstood (or not understood at all).

Of course, this only works if you speak more than one language. If you try to translate something from English to a language that you do not speak at all, you will have no way of knowing whether or not the translation makes sense. The SoP participants found that, if they didn't speak a particular language, the best way to use the online translation tools was to write in their native language and let the recipient use an online translator to translate it into their own language. The recipient could then see what made sense and what didn't. If the recipient didn't understand part of the message, this opened the door for questioning and further communication. Key factors in writing material that translated well with online tools included the use of short sentences and the simplest grammatical structure possible. We also found it helpful to avoid dependent clauses, use of the passive voice, and large numbers of adjectives or adverbs.

Promoting equity and inclusivity. Language issues caused varying levels of exclusion from programs and projects, both in IPY and SoP. At one extreme, some people who didn't speak English were completely excluded either because they were not asked to participate or were not informed about projects. In other cases, people chose not to participate either because they felt they could not communicate in English or were uncomfortable with their command of the language.

A Chilean science communicator made an important statement that summed up many of the key issues around the effects of the predominant use of English as the international medium of communication on people in his country, and I believe it is relevant to other countries as well. First, he stressed that it is important for a country like Chile to be able to explain their perspectives to others in the world, and that this required the ability to communicate in English:

> Communication has the communicator and the receiver. The point of view of the communicator, of us as a country that is producing information, is extremely

> important. The perspective that a Latin American country, the point of view of a country that is very close to Antarctica and whose ecosystem is related to that of Antarctica, is very different from the perspective of a country that is in the North. Chile's perspective, as a country that produces very few greenhouse gases, and the perspective of the United States or China or India, are very different. It is very important that the population, not only on a political level but also as common citizens, can use different avenues of communication to explain their preoccupations on a world level. *(NNES respondent, author's translation)*

Then he addressed the problem of knowledge transfer to the general population, expressing his opinion that the language barrier excluded people by limiting their ability to understand the issues and, therefore, their ability to influence the political process or take effective action on important issues such as climate change:

> But in addition, there is the other perspective. As common citizens, including the leaders, the English language allows them to access quality information that the developed countries are producing since the great majority of information, the studies about climate change, are in English. If our population doesn't manage the language, it is not going to access this information. And a lack of quality information will not permit us to take a critical vision about this phenomenon and how they may influence, with their opinion and their action, the political bodies to take measures. But also they will be ignorant. And with ignorance, probably when the effects of climate change become very strong in our region it will be too late to take preventive measures. And that is it, not only on a leader or political level, but also at the level of citizens. *(NNES respondent, author's translation)*

He went on to discuss what he saw as the first steps towards addressing the issues both of access to quality scientific information that is currently available only in English and of sharing local perspectives with the rest of the world:

> What we need to do is to work with short-term, medium-term and long-term strategies. The long-term strategy has to do with increasing the hours of English in the high schools. It is important that the university strengthens their Bachelor's program in English. Also, I believe that the people who work in this scientific area have to serve as translators, in order to help in communication, or those of us who work as communicators, have to help to the population develop scientific literacy and to understand the importance of scientific studies about global climate, the importance of having a strong, large scientific community. The importance that science can have in communicating, connecting with politicians so that they can take critical informed decisions, not just considering the short term, but always looking to the future. We need to develop an attitude on the part of the universities and the scientists to be conscious of the importance of sharing what they are doing. Toward the political powers and towards the community in general. *(NNES respondent, author's translation)*

Many of the issues of equity and inclusivity that were discussed in interviews and conversations, such as this Chilean example, are systemic problems that need to be addressed at a national or state level. Crystal (2007) has argued that if English language learning (i.e., teaching) is taken seriously starting from an early age, the "elitism argument evaporates" (p. 17). He went on to use Denmark, Sweden and the Netherlands, which are all wealthy countries, as examples. This sounds good in theory, but in practice many countries, such as most of South America, don't have a sufficient number of trained English teachers (ones who can actually speak the language) in public schools, so

learning the language remains mostly the privilege of those who are able to afford it economically. Teachers in the public schools are often poorly trained in English and poorly paid. Almost every person I interviewed in South America stated that learning English is expensive, and only accessible to those who have the opportunity for long-term education. Most stated that they had studied English in school, but they had not learned it there, unless they had attended a private school. One Brazilian teacher in a public school told me that she had been teaching English for five years, but that I was the first native speaker she had ever spoken with. She said that she taught her English classes "95% in Portuguese." I received similar responses from Chilean teachers who told me that they spoke good English at the time they received their university degrees, but that they lost this ability once they started teaching English because they never had the opportunity to use the language. In a further discussion, one teacher told me that she couldn't teach her English classes in English because she was mandated to complete a given curriculum each year and doing it in English "takes too much time."

Despite the systemic problems, there are strategies that can be used to improve and promote inclusivity at an individual level.

Adjust pace and allow for "wait time." The speed at which native English speakers spoke had been identified as an issue by almost all of the non-native speakers in the IPY interviews. I noticed the same thing when I was attending the Brazilian polar researchers' conference. This was a problem not only for me when listening to presentations in Portuguese, but for some of the Spanish speakers as well. In my field notes, I made this observation:

> The following presentation was the same way – the title slide was in English, but the rest of the slides were in Portuguese. This guy spoke Portuguese extremely fast, which probably limited the Spanish speakers' comprehension. I tried to

> follow for a while but it just got too tiring to keep up, so I eventually zoned out. A participant from Argentina told me she could get the basics of what he was saying, but not really follow the talk because of the speed with which he spoke. She also said that she was getting angry: "I realise that most people here speak Portuguese, but they should give a chance for us once in a while!" *(author's field notes)*

I spoke with her later and asked her if she had any suggestions for ways to make international conferences and meetings more equitable and accessible for non-native speakers. She felt that it would be helpful if non-native speakers were given detailed synopses and notes beforehand summarising what would be discussed at meetings. This would give them the time to think about it and prepare their ideas in advance.

Computer technology can also be used to provide the needed "wait time" and give people a chance to organise their thoughts and ideas in another language. One IPY respondent told me that she was teaching an online course for university undergraduates, and that her experience illustrated some of the potential benefits of this format for international meetings or projects:

> It's been really interesting to watch how the students work. We pre-record the lectures for them and then we have a discussion forum where, after they've watched the lectures, they can … ask the lecturers questions. And the questions which they ask are way better than if you just gave them a live lecture and gave them the opportunity to ask questions at the end 'cause they have time to digest and to formulate their questions. And I'm wondering if you set up a scenario where you had a talk and you all had a chance to go away and think about what you wanted to say. So if I was working in German, I'd have a very hard time saying anything intelligent in German in real time. But if I had a chance to take a

> grasp of the concept and then go away, think about it, maybe write down my thoughts in English and maybe then translate them, or maybe ask a friend to help me translate them, and then put them back forward, it would kind of give everyone more of a chance to put their ideas forward. *(NES respondent)*

A Chilean researcher pointed out that computer technology can also be helpful, not just for translation or to allow time for reflection, but also as a means of engaging people in the 21st century:

> At least in Magallanes, the young people, who are those who are going to have to confront these more complex problems, without doubt, are not reading books. They don't read newspapers, they don't read scientific articles, but they do use Twitter and Facebook, and the social media can add a lot in terms of rapid, effective communication via the Internet. Therefore, I think there we could incorporate information in this type of communication – short, precise, aimed at young people in an opportune manner. For example, we know that a lot of young tourists come to Magallanes to visit Torres del Paine [a famous national park], for example. And simultaneously, at the same time, they are communicating with someone in Italy and the United States and so forth about what they are doing at that moment. It's very fast. I think it's worth using. *(NNES respondent, author's translation)*

Include alternatives to written or spoken language. When language abilities are limited, other communication factors become even more important. Alternate forms of expression such as art, music and drama can be used to great effect, especially with children. The French polar researcher working in Greenland commented on the imaginative techniques for communication used by the French and Greenlandic children in her project:

> Both groups of students have just begun to learn English, so found it quite difficult to speak English. So I was surprised to see how imaginative they can be at finding other ways to communicate between each other. We lacked words, so it was more like an artistic presentation. So there were a lot of songs, some drama representation, you know, for instance, the French children, they explained to the Greenlandic children how we celebrate some French celebrations like … Easter or Christmas or the Day of Music. And they didn't have to explain with words because they put in representation what we did. … And they also showed some Greenlandic polka, things like that, and for carnival, for instance, both groups came dressed for carnival. So it was quite nice to see that they were able to find a way to communicate without language. *(NNES respondent)*

Many of my NNES respondents also gave examples of good general presentation techniques for conferences or meetings that they found helpful. These included the use of visuals such as photographs, maps, charts, diagrams or graphs; simple wording on presentation slides; a logical and sequential presentation structure; proper use of the microphone; a slow speaking speed; the avoidance of slang and or other jargon; and the use of simple wording where possible. All of these techniques depend on NES participants having an awareness of the potential difficulties faced by their NNES colleagues that is strong enough and persistent enough to guide communication behaviours on a daily basis.

Promote awareness in native English speakers. Spending extended periods of time immersed in different cultures and different linguistic settings was extremely valuable in helping me understand the difficulties inherent in intercultural and cross-linguistic communication. As noted by Burck (2005):

> On entering a new language, individuals moved from being in language unselfconsciously to noticing language, its effects and its limitations. This acute awareness of what language can and cannot do and of a plurality of meanings eschews the illusion of shared assumptions and predictability with which we communicate most of the time. (p. 184)

This was definitely true in my case. When working with the IPY EOC committee and working groups, I was part of the dominant language and culture. While those of us who had experience with other languages and cultures were, at some level, aware of the potential difficulties faced by our NNES peers, I don't think we did much to accommodate their needs. This was especially true when we were brainstorming ideas and making plans because people got excited and began talking very rapidly. Often there were several conversations going on at once, which can be very difficult for someone from a different linguistic background to follow.

In Malaysia, Brazil, Chile, and Greenland, on the other hand, I was the "foreign language" speaker, so I got to experience the difficulties of communication from that perspective. At first, the people I was working with in Malaysia were very conscientious about speaking in English when I was present, but after I had been around for a while, they began to converse more and more in Malay. I think there were a couple of reasons for this. They realised that I could understand a good deal of the language even if I did not speak it. They also started to relate to me more as one of the group, rather than as an outsider.

Accommodation theory in cross-linguistic communication literature often emphasises the importance of native speakers (or those with the greatest fluency) accommodating toward their respondents (see, for example, Jenkins et al., 2011). In my experience, however, much of the accommodation depends on the person who does not

speak the dominant language, or does not speak it well. In Malaysia, where much of the conversation was in Malay (or I did not understand the English because of the accent or particular wording used), the onus was on me to ask for clarification or rewording if I did not understand something that was said. Otherwise, the speaker(s) just assumed that I understood and went on from there. If I did not ask, it often led to misunderstandings several days later. I might question something and they would reply, "Remember, we talked about that last week."

The Greek philosopher Epictetus is quoted as saying, "If you want to improve, be content to be thought stupid and foolish" (Higginson, 1948). Asking for clarification or admitting that I didn't understand when I was working in another language was difficult for me, especially at first. Like most people, I don't like to look "stupid," which is how I felt on an emotional level, even while recognising intellectually that this was nonsense. This tendency was also recognised by Fredriksson and colleagues (2006) in their study of an international corporation based in Germany that had adopted English as the corporate language. They remarked that "the German negotiators tried to act as if they had understood everything for a considerable period of time before a misunderstanding was acknowledged" (p. 418). Other researchers have also noted that employees in multinational corporations often fear that incorrect grammar or other mistakes will reflect poorly on their professional competence (Charles, 2006; Tange & Lauring, 2009). Recognising and overcoming these fears are important steps in developing successful cross-linguistic research collaborations.

We are all cognisant, at varying levels, that not everyone speaks or understands English with the same level of fluency (or the same level of confidence) but, as noted by Ehrenreich (2010), this does not necessarily carry over into our communication behaviour. In some cases, NESs don't appear even to consider what issues might arise

from this. One NNES respondent commented to me, "I've met a lot of Americans who just didn't even seem to think it was an issue. It's more important having an awareness of your lack of sensitivity towards what it's like to speak another language, I guess."

A Chilean researcher expressed similar sentiments:

> I think what confronts all of us social scientists in this region is the difficulty with conferences, that all of the research, the methods, the conclusions are in English. In general, the academics learn to read a paper in English, incorporate this information in English, but by force of habit, because it is a necessity. But it is difficult to take part in the discussions. In general, Latin Americans are forced to speak and to read in things in English. But the problem is not only that the Latin Americans read very little English, but also the North Americans, in terms of scientific efforts, they also don't put much effort into making themselves understood. I think this has improved very much during the last 10 years, but we still need progress. *(NNES respondent, author's translation)*

Awareness of the challenges faced by NNESs and the need for patience when communicating in English begins with developing and maintaining personal and professional respect for all participants. It takes more time and effort for those who are speaking in a non-native language, and this can be difficult for some NESs, especially if they are from a culture that is accustomed to resolving issues quickly and directly. One IPY respondent commented on this:

> If English is your second language and you're trying to communicate in English, you're both trying to communicate the concept and you're trying to just figure out the words to make that concept and so it can sometimes come across as quite a laboured sentence. To the native English speaker that can sometimes be

> frustrating to listen to and it's difficult. It takes a lot of patience to really listen and try to figure out what it is this person's trying to say. *(NES respondent)*

An Icelandic respondent suggested that this problem could be partially overcome by allowing people from NNES countries to have extra delegates at conferences and meetings that are being held in English:

> If we had an international conference or international get together, people need to know that those who are not native, or it's not their mother tongue, the English language, they must be very aware of the other delegates. For example, it's not enough to bring one from Iceland. You have to bring two so they can have a discussion in their own language, for example, in the afternoon they can discuss what happened in the meeting and get a mutual understanding. For me, when I'm in a conference, when I'm alone from Iceland, that means I have no one to discuss what was, so I'm kind of in isolation. *(NNES respondent)*

Some respondents also suggested that schools, colleges, universities, NGOs, and other organisations should provide more opportunities for training about cross-language communication strategies to help build this awareness. Similar recommendations have also been made in relation to international business. Sweeny and Hua (2010) suggested that this type of training would not only increase native speakers' awareness of the issues faced by others and their knowledge of the accepted norms of different languages, but would also lead people to "a deeper understanding of their own communication style, the problems that it could pose, and the relationship between communication and the goal of the interaction" (p. 500).

Encourage native English speakers to learn a second language. NES students should also be encouraged to study another language so they have a greater awareness of another culture and the difficulties involved in communicating in a non-native language.

This will require a major attitude shift among NESs since, as noted by De Swaan (2010), there is currently little incentive for them to learn another language. This attitude is sometimes justified by comments such as: "Everybody speaks English, so I don't need another language." Others point to the size of the country or their personal lack of natural ability with languages. Several of my NES respondents made comments such as the following to justify their lack of knowledge of a second language:

> Because US kids, most of them don't speak another language; we're just too big, you know.
>
> My native language is English and I have no skill in any other language despite years of training.
>
> I don't think I even had to take a language when I was in high school, so I took French, but I was really poor at it.
>
> I am so bad at languages. *(NES respondents' comments)*

It was pointed out by other respondents that many people don't have the luxury of deciding not to learn another language because they are "bad at languages." If they want to pursue a career in science, travel or work internationally, or in some cases, get good jobs in their own country, they have to learn English despite their level of natural ability. One NNES respondent who has worked primarily in English for many years commented, "I am far from a language person, so to me language is a challenge."

Studying another language is especially important if you have or plan to have ongoing collaboration with people in a given country. Even if your command of the second language you are working with (e.g., Chinese, Spanish, Arabic, etc.) will never be as good as your colleagues' English, your attempts to communicate in their language will open new perspectives on the culture and give you a greater awareness of the challenges faced by NNESs. An attempt to communicate in your colleagues' language is also a sign

of respect that, in my personal experience, is highly appreciated because it shows that you value their language and their culture. When working in South America I was thanked by several interview respondents for speaking with them in Spanish, even though their English was often more fluent than my Spanish. I was also told that it was very unusual for a native English speaker to do this; generally, they automatically assume that everything will be done in English.

Impacts of English Domination on Science and Scientific Researchers

One of the areas of greatest concern among the people with whom I spoke was the effect of our reliance on English as the international language of science. Many scientists I spoke with expressed concern that their work, or the work of their colleagues, would be considered of lower standard because of their lack of fluency in English. This perception of lack of professionalism or expertise may lead to high quality research being ignored or marginalised by those with greater English proficiency. This sentiment has also been noted in the research literature, as exemplified by Durand (2006) who commented, "It is difficult for anyone to be considered an expert when one does not sound like an expert, and proficiency in the language used is a necessary condition, albeit obviously not the only one" (p. 52). A European science communicator reinforced this view when he said:

> Sometimes people perceive that the Chinese scientists aren't really up to scratch, which it is definitely behind in terms of climate and hard sciences, it's definitely not as advanced as US or European science is. Nevertheless, I think it's also a disadvantage because these people can't publish in English journals, so it's, a lot of them, it's a <u>big</u> effort for them to publish information in English journals. *(NNES respondent)*

Scientists and other researchers responding to my questions expressed their opinions that a lack of English skills also limits people's opportunities to publish their research, obtain funding, and attend and present at conferences. Their comments echoed concerns expressed by academics from UNAM about how their lack of English skills impacted their career advancement (García Landa, 2006). One NNES respondent felt that the problem went deeper still because, due to the fact that most scientific research is published in English, this is also very influential in determining what research questions are asked. This may restrict or redirect the process of knowledge production or distribution, in part because so many different types of knowledge are embedded in specific languages (Besemeres, 2006; Martinovic & Altarriba, 2013). As expressed by one of my respondents:

> There is concepts and ideas very deep in languages and by choosing one language as a common *lingua* for a few, you might lose some qualities in communication, or the communication become geared in one direction rather than another as you would have got if you had a different language as a common. *(NNES respondent)*

Thinking about your research in another language can also lead you to a greater understanding of your research topic, as well as help promote deeper cross-linguistic communication. As one polar researcher said:

> If you then trigger a debate on the meaning of terms or some kind of other, like landscape terms, for example, which is where I learned, for the North, or vegetation style or concepts of snow and ice and such things, one often see that each of the persons around the table might have stronger or more similar concepts for those things in each of the language, which actually would match well but since English is a very weak language on those kind of stuff, when you communicate, if I sit down and speak with a person from Russia, my Norwegian

> or their Russian or their other native language would have been way better than using English as a point of translation. So you lose a lot in precision and quality of communication because you have to use this rather limited language in some areas. *(NNES respondent)*

A South American researcher expressed frustration that important local knowledge gained from research does not gain wide recognition in the international science community because of language issues:

> In our case, archaeologists, we have a relationship with the rhythms of people here in this region; we have something to say about the effect on the megafauna, about the extinction of ancient large animals – if it was the result of climate change, or overhunting on the part of people. And this doesn't seem interesting because we are not able to write about it at a world level. Because we always have to deal with the limitation of the language to write an article, to go to a conference, to get funding. Because, in some cases, it would be better to present it in our language, no? And the fact is that we can write it in our language, but when it comes to pertinent discussions it's a problem to do it in Spanish. But I believe, in this particular case, we have something to say about climate change. Even though it is past climate change, we can compare it with the present. The role of humans in the past and the present, in relation to the damage they can do to the environment. I think language affects a little our possibility to communicate this in English-language journals. *(NNES respondent, author's translation)*

The validity of these concerns was illustrated by one NES IPY researcher. I asked him if he thought that a lack of materials in native languages about climate change research in non-English speaking countries affected the ability of people in those countries to participate in discussions about the issues. He replied, "I don't know how

much Chinese is being used to talk about climate change, alright, or I don't know how much Portuguese climate change information there is out there because I only pay attention to the English." *(NES respondent)*

Not everyone sees the increasing use of English in science as completely negative, however. One NES researcher said that, in his experience, English has become more widely learned and used over the past two decades and that this has made it easier for people to talk directly with each other:

> If we had a meeting on ship operations in Togo in 1990, it would have been all through translators. Entirely through translators. If we have a meeting of Arctic icebreakers now, Norway, Canada, China, Russia, it will all be in English and, for the most part, the principals will all be comfortable in working in English. So that's a change that I've seen in 20 years. *(NES respondent)*

He also noted that during IPY there was an increase in new polar journals in national languages, reflecting growing awareness of the importance of other languages in science:

> What we also saw in IPY, we saw the start of a new polar journal in Japanese; we see increasing number of science publications in China, so you know, there's both tendencies. There's both a common language tendency and a growing native language, national language, pride of publication system. *(NES respondent)*

From the language of science to the languages of the public. In order to address environmental issues effectively, scientific knowledge must not remain solely the possession of scientific or academic communities. Making this knowledge accessible to the public is a problem even within the English-speaking world. In a recent survey, the Australian Academy of Science found that only 59% of Australians surveyed knew how long it takes the Earth to orbit the sun, and only 9% knew how much of the Earth's water is freshwater (N. Wyatt & Stolper, 2013). This is not unique to Australia. A polar

researcher from another English-speaking country spoke about her surprise at the low level of public knowledge about science in her country:

> I spent four years working in polar research, including a winter in climate-related research, and when I returned from my winter in Antarctica, I was pretty shocked by how much we knew in the science community about climate change and how little seemed to be getting through to public, and it seemed to me that there was a massive gulf. There was a need to focus on that bridge between science and society as opposed to just generating more science information. *(NES respondent)*

The process of scientific knowledge transfer becomes even more complex when the everyday language of the public is not English. When research is carried out and published in English, it is often not translated into other languages even if the research occurred in a non-Anglophone country. One Chilean researcher shared her perspective on how this influences local community involvement in science in her country:

> I think it [English] is a language that is imposed, basically, and you can't fight against that. And in that sense, I imagine that from what I have seen in the academic environment, it's OK. Researchers in general read in English, but in dialogues it becomes more complicated. This is at the level of the academic community. But at the level of the general community, they remain completely uninvolved. None of the newspapers, none of the media make efforts to get the information or understand the discussions to get it. They accept it when an important person comes, they allow an important person to give an interview, but it's a very superficial treatment and doesn't have much depth to it. And that's the way we make use of it at the community level, the information that is available. *(NNES respondent)*

In addition to the problems caused by the fact that so much important research is published in English, the use of scientific vocabulary adds one more layer of complexity. As one NES researcher pointed out, "There's scientific jargon English and it's a different language than conversational English for much of the public, so already we're seeing a separation between the professional language and the public language." *(NES respondent)* This disparity in terminology causes particular problems at the school level in countries where English is not the first language of the students, as illustrated by the comments of an English teacher in Greenland:

> We're talking about two different kinds of English. We're talking almost like a business English, a science English, compared to a colloquial spoken English. You know, daily life. And students do not have a high level of academic English, of scientific English. So when we talk about global warming there are a lot of terms that students will not understand. *(NNES respondent)*

This lack of public understanding and involvement in science and environmental issues is detrimental to both human society and the natural environment because it also limits people's abilities to participate in democratic processes and influence political decisions. It can also limit the ability of resource managers to access critical information. Another Chilean researcher gave an example from his experience:

> When one returns to local situations it [using English] causes problems transferring the international concern, the global preoccupation, to the local situation. … There are times when the community studying ecology publishes an article in a scientific journal about the analysis, very serious, with scientific data, about the current status of the natural resources in the marine ecosystem along the whole Chilean coastline. But they write in English. Therefore, when the authorities want to take elements to redefine the politics of resource use, or when

> the fishermen want to understand the problem with which they are dealing, they have to read an article in English. And obviously, it doesn't work. It really doesn't work. Therefore I have a fear that this use of English works against local decisions. *(NNES respondent, author's translation)*

One Brazilian respondent commented that there is a missing link in the process of translating and making scientific information available for the use of government and the public, and felt that scientists should be participating more actively with schools and NGOs. Several Chilean researchers also expressed their feeling that scientists have a responsibility to serve as translators, both in terms of translating their research results from English into native languages and in making their work accessible to the public by avoiding scientific jargon.

A potential problem here is that, having studied science in English for the greater part of their education, researchers often find it difficult to explain their science in their native language. In some cases, this may be because the words don't exist in a given language, or have a different connotation in that language. In other cases, the scientists themselves don't know the words in their native language. One IPY respondent had discussed this at length with postgraduate researchers from Scandinavian countries:

> I would talk to the Scandinavian students there, who were brilliant in English and brilliant in … their native language. They would say, because they lived in an English world in their daily work lives, in their laboratories and their research offices, they had a hard time taking their work home to their families because, in their families, they were speaking Norwegian or Swedish and they learned the English lingo for, you know, ADCP or whatever. I mean, think of the whole science jargon. So they learned the jargon in English and they often didn't have

> native language words in order to be able to tell their mother or their grandmother what they were doing in their work. *(NES respondent)*

Challenges of translation. It is apparent from the preceding comments and discussion that translation of scientific information and related educational materials into native languages, and at levels accessible to the public, is seen as being extremely important in facilitating communication and collaboration on environmental issues. This is true at both local and international levels.

Teachers, in particular, were concerned about the differences between general conversational English and the English needed to understand and discuss scientific or environmental topics. A secondary school headmaster from Iceland noted that even though most Icelanders speak a reasonable level of English, science was a problem:

> Even though we are, as a nation, quite fluent in English, it's more like in general communication. But if it comes to difficult science texts, we will have to translate to Icelandic. You need expertise; you need training in English to be able to make use of that. So, yeah, I would say if you're working in the elementary or secondary school with climate change, you would have to translate to make the best of it. *(NNES respondent)*

Another Icelandic teacher agreed with this, saying that a lack of material in Icelandic does limit people's participation in climate change discussions and education activities in Iceland. She felt that the highlights of new information and discoveries should be translated, because if the materials were not in Icelandic, few people would use them. Without information in Icelandic, she was concerned that people wouldn't get all the different perspectives about an issue and would only receive limited, and possibly biased, viewpoints.

The issue was seen as even more problematic in Greenland, where English may be the third or fourth language of most of the population. One teacher, echoing similar sentiments expressed by IPY respondents, felt that reading in English was especially difficult for most people:

> I think that it means that a lot of local people up here won't understand it as well. They might not read it because if they see that the text is in English then a lot of people will just stop at that. Even a lot of people in Denmark will stop at that. It's just really, it's really difficult to read stuff, like to read things that are, you know, like facts about things, in a different language. And since it's like actually their third language, then it's really hard for people to read information in English. *(NNES respondent)*

Unfortunately, as noted by Squires (2009), translation is not a straightforward, simple process. Two issues came up repeatedly in my interviews and conversations: difficulties in maintaining the original meaning (conceptual equivalence) and that of resources needed (time and money).

Maintaining conceptual equivalence. Some languages lack the words for certain scientific concepts. English and many other languages have coped with this by adopting foreign words and making them part of the language (Crystal, 2007). In languages such as Greenlandic, however, this is not as easy to do. A Danish teacher in Greenland commented on some problems he had noticed in discussing climate change in the schools:

> Much of the information is limited because there's a huge language difference between Greenlandic as a science language compared to Danish and English. There are in the Greenlandic language, there are a lot of scientific terms that you don't even have a word for. Because Greenlandic is a polysynthetic language, so

> you would have more of a descriptive rather than analytic approach to what language is. … It is possible that because Greenlandic does not have the same broad language capability toward science that Danish or English has, that … it limits children's perspectives on what climate change is. *(NNES respondent)*

A Greenlandic science teacher strongly agreed with this, saying that she teaches primarily in Greenlandic, but that it is not always possible to do so because of the limitations of the language:

> There are so many different words and meanings and you can't translate into Greenlandic without the meaning getting, the meaning will be wrong if you try to translate it. You can't really do it. So it wouldn't help. On the contrary, it will be more confusing. When I teach science and chemistry, I have chosen only Danish material because you don't really have, you have Greenlandic material for the students, but they are very, very poor and sometimes it's just a lot of nonsense and doesn't make sense. And also, when you go to gymnasium, college, university you don't have any word for it in Greenlandic, so they might as well start now by learning what's right in the language that it's available in. *(NNES respondent)*

I saw an example of this problem when I was observing one of this teacher's science classes. She was teaching a unit on weather that involved sending the students outside with thermometers to take air temperature readings. As she was explaining the task to them in Greenlandic, the students suddenly burst into laughter. In a discussion with me after the class, she explained that there is no word for "thermometer" in Greenlandic, so she had used a word that basically meant "the thing you use to measure your temperature when you are ill," which the students found very funny.

A Malaysian environmental educator also spoke about the challenges of translation that students in her region face when trying to do research using the Internet:

> The medium that we need to use in these schools is Bahasa Melayu. And when we give something, something that is in Bahasa in English, they don't understand it. And they need to do more reading, to explain more on the matter of, for example, if you say that, uh, rainwater harvesting, they say "What is rainwater harvesting? Is that like harvest?" When we say "harvest," when translate we say "keeping." Yes, you have to keep rainwater; that's why we call it rainwater harvesting. As in, if we cannot find in Internet, we say that "padahan air hujan," mean keep the rainwater. … So this is the key word they need to use in order to do the research. So, part of the problem here is that they don't have these English key words in order for them to do the research in the Internet. *(NNES respondent)*

She went on to explain that sometimes it was not possible to use Malay words to explain some scientific concepts because of problems with concept equivalency in translation, and that the students needed at least a minimal understanding of the key words in English:

> My opinion is that the students have to start study the key words in English, rather than to translate it into Bahasa Melayu. Because it's really become very different words when you translate it into Bahasa Melayu and the meaning also will be different. Totally different at times when we translate it. *(NNES respondent)*

The issue of appropriate translation extends to her own role as an educator as she attempts to explain concepts to the students:

> They know that "padahan air hujan," but when you say rainwater harvesting, is something new for them. New words for them. So is a problem for us, is a challenge for us, actually, to translate from English to Bahasa Melayu. That is why when we do road show or something, sometimes I got no choice, I'm using English to tell them, in order for them to get the information. *(NNES respondent)*

Her approach was to use a bilingual strategy whenever possible to help negotiate meaning among two very different populations within Malaysia:

> To tell others about the environment, to do the green living, green harvesting ... I mean how to plant trees, rural area is more advanced compared urban area, actually. But only the rural area doesn't know how to translate it into words. To give information to others. For example, they do composting, but they don't call it composting. ... They call it "baja" but they doesn't know we don't call it baja, we call it compost. So this is the thing that, when the rurals say the fertiliser, but in urban say compost. So what we always did was "baja-compost;" we used the two words. So that they understand more. Baja, fertiliser; fertiliser, compost. We mixed the two words. *(NNES respondent)*

Even when the words exist in a given language, researchers who are accustomed to working and publishing in English may find it difficult to translate materials to their native language because some of the translated terms don't sound right to them:

> Most of my research background was in England and when I came back to Portugal and tried to translate even the common name of my species, you know the albatrosses, they sounded so weird, I felt like "I can't say this." You know it sounds like so weird to me because for me it's called "wandering albatross," not "albatros viajero." I mean what the hell is this? You know it's like blah, blah, blah, you know it doesn't sound right. It's a major barrier immediately. *(NNES respondent)*

In some cases, on the other hand, the use of an English term may be a deliberate strategy to highlight a particular issue, similar to approaches used by corporations to advertise their products, rather than a problem with translation (Bhatia & Ritchie, 2013). A Dutch respondent illustrated this when speaking about communication techniques used

in the Netherlands to increase public awareness of the international nature of climate change:

> In the Netherlands, there are a lot of newspaper headings not using as we call it "klimaatverandering," but they just take the English term "climate change" because it gives more impact, giving people the idea it's an international thing. *(NNES respondent)*

Who is responsible for translation?

As noted earlier, there was strong agreement among the research respondents that scientists should take active roles as translators to make science accessible to politicians, educators and the general public at local, regional and national levels. This would imply that they also have a responsibility to make English-language research available in native languages.

Although my respondents agreed in principle that it is the responsibility of scientists and social science researchers to make their research results accessible to the public, they also mentioned that their efforts at translation were limited by both time and money. As one Chilean researcher said:

> I would like to think that, in the first place, it's the university … that should take the lead in these matters of research into conservation, in climate change, etc. They work in English, but they should put it into Spanish so that it can be of use to the authorities, to the schools, to the general public who use the resources. The fishermen, the oil company people. I think the university has a responsibility because there is no other institution, simply, that can translate that in a rational manner. … However, for this we would need financing. And there is no financing for this type of activity. *(NNES respondent, author's translation)*

Unfortunately, good quality translation is not cheap, as members of the European Union could testify. In 2012, the European Commission spent approximately 333 million euro on translation efforts. This figure does not include interpretation services (One Europe, 2013).

The IPY EOC program had some success with the use of volunteers to translate materials, and this is another avenue that can be used effectively. However, this requires dedicated people who are willing to make the effort and put in the time needed. One European researcher who did a lot of translating for IPY commented that translation to his native language was especially time-consuming because he was so used to working in English. It was even more difficult when he was trying to translate materials that were not directly related to his specific research field:

> I translated international Polar Days; I translated materials that were not in my research area. I had numerous difficulties in finding a word into my own language, so translating the subject was a difficulty. … You had to waste more time searching and translating the word and that is one of the limitations. *(NNES respondent)*

Volunteers can provide a valuable contribution, but this is not enough to meet the need. Financial resources for translation work must be allocated by both government and non-government research agencies and organisations. This requires raising the consciousness of researchers, administrators, and policy makers about the importance and the value of making science accessible to the public, as well as increasing their understanding of the importance of languages other than English in the process.

Summary

It is clear that we live in an age when a lingua franca is essential to address many regional and global environmental and social problems. It is also evident there is at present, and will continue to be for the foreseeable future, a heavy dependence on English as the principal international lingua franca. This chapter discussed the perspectives of scientific researchers, science communicators, educators, and youth leaders from more than 20 countries. It identified some common issues in cross-linguistic communication and outlined some possible strategies for their resolution.

Many of the strategies are steps that individuals can take to improve their personal skills in communication. These include critical self-reflection to recognise and analyse our unconscious assumptions, initiating communication with an emphasis on similarities rather than differences, and the use of speech accommodation strategies to assist non-native speakers in the communication process. Developing close personal and professional connections and strong local networks was also seen as crucial to successful collaboration. In addition, it was recognised that meaning has to be negotiated between speakers and that the use of non-verbal means of communication, multiple languages, and computer programs such as on-line translators can assist in this endeavour.

It was also noted that science and communication about science have an added layer of linguistic complexity. For one thing, there is a significant difference between colloquial English and scientific English. The same could be said about the study of science in any other language. In addition, languages both help form and reflect different world views and epistemologies. This impacts what research questions are asked, as well as how the answers are interpreted. Translation from one language to another becomes difficult when equivalent words don’t exist in a given language or when researchers or teachers can’t explain scientific concepts in their native languages. This has numerous

implications for education and poses other questions for future research. Some of these are explored in the final chapter.

Chapter 7: Concluding Thoughts

This research journey grew out of my concern about how the use of English as a lingua franca impacted the development, distribution and use of education and outreach projects and resources during the International Polar Year 2007-2008. Insights gained during interviews with key IPY participants led to additional questions and further investigation into the broader implications of ELF on the development of a scientifically literate public that is both capable of, and interested in, working collaboratively at local, regional, and international levels towards a more sustainable future.

As outlined in Chapter 2, numerous researchers have studied the impacts of ELF on international business, on health care in multicultural settings, and on the communication strategies used by people from different language backgrounds. However, little research has been done that is specific to language issues in science and environmental education. This investigation aimed to help fill that gap.

My research findings indicated that language, culture, and technology are inextricably intertwined in this process and must be considered together. It also showed that there are many practical strategies that can help us achieve our goals of improved cross-linguistic communication through developing stronger relationships, working together to construct meaning, and promoting inclusivity and equity. This has numerous implications for education, both in the sciences and for language teaching and learning, and opens avenues for further investigation.

Implications for Science and Science Education

At the present time, anyone who wants to study science at university level or higher will probably have to do much of it in English (Meierkord, 2012). In my study, this point was exemplified by a young Chilean respondent who told me that she had to

hire a translator during her first two years of university study because she couldn't read or understand English.

More research is needed into effective ways to overcome the English-language domination of science and science education. Although all of the respondents in both stages of this research agreed that knowledge of English was essential for high levels of international communication, there was also widespread agreement that the use of native languages was equally, if not more, important for promoting understanding in national and regional contexts, especially in education settings such as schools and museums. One teacher explained her reasoning, emphasising the important links between school and home environments: "As an elementary teacher particularly, I feel that it's critical to use the home language because there is a very big connection between family home culture and school, you know." *(NNES respondent)*

The implications of the impacts of teaching children in English, rather than in their mother tongue, have been studied extensively in several countries. Opoku-Amankwa (2009) reviewed the findings from studies in Ghana, Guinea-Bissau, Niger-West Africa, and Tanzania. He concluded that students not only learned more when taught in their mother tongue, at least in the early years of school, but that they also found it easier to learn a second language later in life. Ali et al. (2011) made similar observations about schoolchildren's experience in Malaysia.

A Mexican-American teacher working with primary students in a bilingual school in the United States commented on two issues related to the use of native languages in science education – a lack of readily available materials in Spanish, and teachers' and students' lack of knowledge of science terms in their native language (most students were recent immigrants from Mexico who spoke Spanish as their native language):

> In Texas where we're trying to establish some bilingual programs, there is still a debate around how are you supposed to teach science in English and Spanish. One of the arguments is that there are no materials in Spanish, or the teachers don't have the knowledge of science in Spanish, the vocabulary. I am concerned about it because I believe, particularly in elementary, in primary, elementary, I think it's important that the children continue developing scientific language in their home language. At the same time, though, they have to learn in English. I think that English really is very important. But mainly I think their not developing their home language is the lack of materials. Or teachers' knowledge of the language, the science language, in Spanish. *(NNES respondent)*

The Mexican-American teacher went on to emphasise her belief that science should be taught bilingually, in both the native language and English, to help prepare NNES students for future studies in science:

> What I really feel is critical is that we don't discard, in any country, the fact that we can learn science in our own language. And that is critical, that we have the opportunity to develop scientific knowledge, scientific literacy, you know, in two languages. And English is, you know, always our common language. *(NNES respondent)*

She reinforced the importance of retaining the use of the native language(s) in the school setting as well as using English:

> But what I don't want personally to see is that science around the world is only in English. … Each community has knowledge, in their own language, that is vital and it's not just, you know, language that is just symbols and sounds, but it has a lot of meaning to it. And I think that needs to be preserved and developed in each nation. *(NNES respondent)*

Bilingual science teaching may sound ideal in theory, but more research is needed into the practicalities of such an approach. It could be relatively easy to implement in wealthy countries such as those of Western Europe, North America, or parts of Australasia. Less wealthy countries, however, are often struggling to provide basic education and to persuade the local population of the value of education (Matear, 2008), so an initiative to teach bilingually might have a very low priority. General research questions into the topic could include issues of teacher preparation, the creation of and access to high quality bilingual materials, and assessment of the impact of bilingual science teaching on students' understanding.

Effective bilingual science education programs might help narrow the gap and eliminate some of the barriers of English-domination for NNES students; however, they would not help with the issue of the lack of awareness and poor accommodation strategies prevalent among NESs. This could be more effectively addressed through encouraging them to learn another language, as discussed in the following section.

Implications for Language Learning

There are two very different issues involved in language learning in the context of international communication about environmental issues. One is how to make effective English language instruction accessible, affordable and relevant to speakers of other languages. In many respects, this is a systemic issue that must be addressed at the level of national language and education policies, and is really outside the scope of this study. The other, often overlooked, problem is how to persuade NESs of the value of learning another language, and to overcome the common "I'm no good at languages" philosophy. Despite the different issues of motivation and effectiveness, several ideas emerged from my research that are relevant to both groups and that merit further study.

An early exposure to a foreign language and culture can have an effect on a person's willingness and ability to communicate (Burck, 2005). This was illustrated by one teacher who participated in the SoP project. K was born in Australia of Danish parents and moved to Denmark when she was one year old. She grew up speaking Danish at home but she had relatives living in Australia, so when they were all together they communicated mostly in English. If any of them couldn't think of the English word for something, they would use Danish and it would be understood by all of them. During the SoP project, this teacher corresponded frequently with one of the Chilean teachers (R). K wrote in English, and R would respond in Spanish. K said that she would cut and paste R's messages into Google Translate and could then understand the majority of what R was saying. Because she was used to moving between languages, this was "not a big deal" for her.

There was also a general consensus among my respondents, based on their personal experiences both as students and teachers, that learning a second language at an early age makes it easier to switch between languages and understand not only the words, but the emotions expressed and the more subtle meanings behind the words. This can also help with some of the issues of maintaining conceptual equivalence in translations. These observations are in agreement with numerous studies about the relationship between age and language learning (see, for example, Bialystok, 2013; Burck, 2005; Dewaele, 2010; Yeganeh, 2013). As a Belgian respondent commented:

> We have here, for example, the French people, they do address, their written language, they do address people in a completely different way so, if you translate it, it's not of sense any more in Flanders. It cannot be used. … When you are younger, seemingly you don't have that problem. Seemingly you understand how

> to swap between languages. Not purely language, but the feeling behind it and small things. OK, so learn young I would say. *(NNES respondent)*

Developing the ability to interpret the intended message behind the words is one key to negotiating meaning in cross-linguistic and intercultural communication. Standard foreign language teaching programs can be very effective when it comes to teaching for intelligibility and comprehensibility, to use Smith and Nelson's (2006) terminology, but they often fail to address issues of interpretability, since interpretability is closely tied to cultural knowledge and understanding. To improve this aspect, foreign language teaching programs should include a strong cultural component. Projects such as SoP are one way to help develop this cultural understanding because they encourage both teachers and students to examine and question their own cultural perspectives as well as learn directly from people with different cultural backgrounds.

People also need an incentive to learn a language, so it makes sense to link it to a practical, engaging, real-world context. One Chilean teacher spoke about what she had learned from her experience teaching English to primary school students:

> Children like to know about what are not everyday things for them. "Everyday" for them is, at least in the schools, technology, noise, daily life. We should take more consideration for what is around them. Therefore, I think that English can be taught or can be inculcated in a person in this way – treating themes that attract their attention. So at the same time you can use it to motivate them first, and not teach English the way they teach it much of the time with a focus on the grammar and the ability to communicate, but rather to teach it using more global themes, more important, more relevant. Although yes, it is important to communicate, to be able to communicate with another person such as to ask them their name and stuff, you can also learn a lot about other themes, about current themes. Therefore,

> that's the connection. To teach English, but in context. *(NNES respondent, author's translation)*

This approach to engagement could be further enhanced by use of Mäkelä et al.'s (2006) concept of language-based clusters based on homophily. In business settings, they noted that people in language-based clusters found it easy to create and maintain interpersonal relationships, and knowledge was more freely exchanged. This strategy could easily be adapted to educational use by developing multi-level clusters of students, starting with local groups, then expanding to national and regional exchanges, and finally working with international participants. Local clusters could work together in the native language(s) before sharing knowledge at broader levels with students who spoke the same or closely related languages (e.g., Spanish and Portuguese). Finally, the groups could exchange information on a wider international level using English as a common language. The SoP project illustrated the feasibility of such an approach as the students first worked through the focus questions in their native languages before sharing what they had learned with their international counterparts.

Understanding and communicating effectively in another language also depends more on having an adequate vocabulary than on mastering good grammar. An English teacher in Greenland emphasised the importance of this for his students:

> From fourth to seventh grade, you shouldn't teach grammar. You teach words and you have fun with language. Then we can teach them grammar the last years and say, OK, you use them this and this way. You don't know any words, how are you supposed to know any grammar? And if you know grammar and don't know any words, how are you supposed to use the language? And if you don't think it is fun to use language, how are you supposed to learn language? *(NNES respondent)*

His comments about problems caused by a lack of "words" resonated with my experiences in Malaysia. While I have a fairly large Malay vocabulary, in terms of the total number of words I can recognise and understand, and have good grasp of the basic rules of grammar, I was lacking in many of the key words needed to make sense of the conversations. I knew many adjectives, adverbs, and basic words such as numbers and days of the week, but I was deficient in important nouns and verbs. This deficiency greatly limited my ability, as well as my desire, to communicate in Malay.

In addition to incorporating a strong cultural component and linking to real-life situations, foreign language education programs should put a greater emphasis on improving students' abilities to communicate rather than focusing on the rules of correct grammar (MacIntyre et al., 1998; Zarrinabadi, 2014), at least in early stages of learning. In this way, students may be more motivated to continue to learn the language and problems such as the fear of making mistakes and the lack of adequate vocabulary might be lessened for many people.

The Greenland teacher's observations about making language "fun" for the students and not focusing on grammar or grammatical errors supported Zarinabadi's (2014) conclusions that students' willingness to communicate in a second language is enhanced by delaying error correction to the end of the lesson and by focusing on topics that are familiar and interesting to the students. This also complements the concept of developing and using multiple language clusters, where the students can become interested in and familiar with the topic in their own language first, before trying to communicate about in in English.

Hope for the Future

There is no such thing as a perfect bridge for international communication and collaboration. Since the beginnings of civilisation when different groups of humans began interacting with each other, it has been through some variety of lingua franca. This has always had the effect of helping to shape the dominant way of thinking of the time, disadvantaging and disenfranchising many people and giving a disproportionate level of power to others. For the last several decades, English has served as the predominant lingua franca. This almost certainly will not always be the case, as history has shown, but it is the reality at the present time.

I strongly believe that those of us in the dominant language group have a moral and ethical obligation to work actively with others to promote a more equitable balance in matters of international communication and collaboration. Issues of language policy and language learning exist on both macro- and micro-scales. It might be difficult for individuals to change some of the macro-scale policies, such as what languages are taught in schools and how they are taught, or how much access people have to the English language through mass media such as television programs (e.g., whether English-language programs are dubbed into another language or subtitled).

Nevertheless, there are many levels at which individuals, especially NESs, can make a difference. This can be achieved by increasing our awareness of the difficulties faced by NNESs in international exchanges, encouraging attitudes of respect, learning another language, developing cultural and personal sensitivity to the issues, and promoting increased training in intercultural and cross-linguistic communication.

My research indicates that grass roots, small-scale projects such as SoP and bottom-up collaborative initiatives like IPY EOC can be effective in helping to bridge the gap on individual levels and can offer hope for the future. As one teacher put it, “I think

it's an opening; it's baby steps, but I feel that we are planting that seed for kids and for teachers and parents to look at languages and culture in a different way … it's a global community." *(NNES respondent)*

References

Ali, N. L., Hamid, M. O., & Moni, K. (2011). English in primary education in Malaysia: policies, outcomes and stakeholders' lived experiences. *Current Issues in Language Planning, 12*(2), 147-166. doi: 10.1080/14664208.2011.584371

Allison, I., & Krupnick, I. (2011). Organization and implementation of IPY: 2005-2009. In I. Krupnick, I. Allison, R. Bell, P. Cutler, D. Hik, J. López-Martinez, V. Rachold, E. Sarukhanian & C. Summerhayes (Eds.), *Understanding the Earth's polar challenges: International Polar Year 2007-2008*. Rovaniemi, Finland: University of the Arctic/CCI Press (Printed Version), Edmonton, Alberta, Canada and ICSU/WMO Joint Committee for International Polar Year 2007-2008.

Ammon, U. (2006). Language planning for international scientific communication: An overview of questions and potential solutions. *Current Issues in Language Planning, 7*(1), 1-30.

Ammon, U. (2010). World languages: Trends and futures. In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 101-122). London: Wiley-Blackwell.

Annan, J. (2005). Situational analysis: A framework for evidence-based practice. *School Psychology International, 26*, 131-146.

APECS. (2013). Annual Report: October 2012 - September 2013: Association of Polar Early Career Scientists.

Arber, S. (2001). Designing samples. In N. Gilbert (Ed.), *Researching social life* (pp. 58-82). London: Sage.

Baeseman, J., Xavier, J., Lantuit, H., & Taylor, A. (2011). Early career researcher activities during IPY. In I. Krupnick, I. Allison, R. Bell, P. Cutler, D. Hik, J. López-Martinez, V. Rachold, E. Surkhanian & C. Summerhayes (Eds.),

Understanding Earth's polar challenges: International Polar Year 2007-2008 (pp. 511-522). Rovaniemi, Finland: University of the Arctic, CCI Press.

Bajerski, A. (2011). The role of French, German and Spanish journals in scientific communication in international geography. *Area, 43*(3), 305-313.

Baker, W. (2009). The cultures of English as a lingua franca. *TESOL Quarterly, 43*(4), 567-592.

Ballard, E. (2013). Pearson buys Brazilian English-teaching firm for $720 million *Wall Street Journal*. Retrieved from http://online.wsj.com/news/articles/SB10001424052702304355104579235353017518332

Basit, T. N. (2003). Manual or electronic? The role of coding in qualitative data analysis. *Educational Research, 45*(2), 143-154. doi: 10.1080/0013188032000133548

Beamer, L., & Varner, I. (2001). *Intercultural communication in the global workplace*. New York: McGraw-Hill/Irwin.

Bernard, H. R., & Ryan, G. W. (2012). *Analyzing qualitative data: Systematic approaches*. Thousand Oaks, CA: Sage.

Besemeres, M. (2006). Language and emotional experience: The voice of translingual memoir. In A. Pavlenko (Ed.), *Bilingual minds: Emotional experience, expression and representation* (pp. 34-58). Clevedon, UK: Multilingual Matters.

Bhatia, T. K., & Ritchie, W. C. (2013). Bilingualism and multilingualism in the global media and advertising. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 622-650). Oxford: Wiley-Blackwell.

Bialystok, E. (2013). The impact of bilingualism and language and literacy development. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 679-705). Oxford: Wiley-Blackwell.

Boix Mansilla, V., & Gardner, H. (2007). From teaching globalization to nurturing global consciousness. In M. Suárez-Orozco (Ed.), *Learning in the global era* (pp. 47-66). Berkeley, CA: University of California Press.

Bourdieu, P., & Thompson, J. B. (1991). *Language and symbolic power* (G. Raymond & M. Adamson, Trans.). Cambridge, UK: Polity Press.

Brigg, M., & Bleiker, R. (2010). Autoethnographic international relations: Exploring the self as a source of knowledge. *Review of International Studies, 36*, 779-798. doi: 10.1017/S0260210510000689

British Council. Retrieved from http://www.britishcouncil.org/organisation

British Council. (2013). The English effect. Retrieved from http://www.britishcouncil.org/sites/britishcouncil.uk2/files/english-effect-report.pdf

Bryant, A., & Charmaz, K. (2007). Grounded theory research: Methods and practices. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbood of grounded theory* (pp. 1-28). London: Sage.

Burbank, V. K. (2011). *An ethnography of stress: The social determinants of health in aboriginal Australia*. New York: Palgrave Macmillan.

Burck, C. (2005). *Multilingual living: Explorations of language and subjectivity*. Basingstoke, Hampshire: Palgrave Macmillan.

Burke, S., Prior, M., & Spehr, K. (2010). Psychology and climate change: A position statement prepared for The Australian Psychological Society: The Australian Psychological Society.

Butler, Y. G. (2013). Bilingualism/multilinguism and second-language acquisition. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilinguism* (pp. 142). Oxford: Wiley-Blackwell.

Canagarajah, S. (2002). *A geopolitics of academic writing*. Pittsburgh, PA: University of Pittsburg Press.

Canagarajah, S. (2006). Negotiating the local in English as a lingua franca. *Annual Review of Applied Linguistics, 26*, 197-218.

Charles, M. (2006). Language matters in global communication. *Journal of Business Communication, 44*(3), 260-282.

Charmaz, K. (2000). Grounded theory: Objectivist and constructivist methods. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 507-535). Thousand Oaks, CA: Sage.

Charmaz, K. (2002). Qualitative interviewing and grounded theory analysis. In J. F. Gubrium & J. A. Holstein (Eds.), *Handbook of interview research* (pp. 507-535). Thousand Oaks, CA: Sage.

CIA. (2014a). The world factbook - Brazil. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/br.html

CIA. (2014b). The world factbook: Chile. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/ci.html

CIA. (2014c). The world factbook: Greenland. Retrieved from https://www.cia.gov/library/publications/the-world-factbook/geos/gl.html

Clarke, A. E. (2005). *Situational analysis: Grounded theory after the postmodern turn*. Thousand Oaks, CA: Sage.

Clarke, A. E., & Friese, C. (2007). Grounded theorizing using situational analysis. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 363-397). London: Sage.

Clarke, A. E., & Star, S. L. (2007). The social worlds/arenas/discourse framework as a theory-methods package. In M. Lynch, O. Amsterdamsta & E. Hackett (Eds.), *The new handbook of science and technology studies*. Cambridge, MA: MIT Press.

Clyne, M., & Sharifizan, F. (2008). English as an international language: Challenges and possibilities. *Australian Review of Applied Linguistics, 31*(3), 28.21-28.16.

Coca Cola. (2014). How many countries sell Coca Cola? Retrieved from http://www.coca-cola.co.uk/faq/company/how-many-countries-sell-coca-cola-is-there-anywhere-in-the-world-that-doesnt.html

Corcoran, P. B., Walker, K. E., & Wals, A. E. (2004). Case studies, make-your-case studies, and case stories: A critique of case-study methodology in sustainability in higher education. *Environmental Education Research, 10*(1), 7-21.

Crystal, D. (2007). *English as a global language*. Cambridge, England: Cambridge University Press.

De Swaan, A. (2010). Language systems. In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 56-76). London: Wiley-Blackwell.

Dewaele, J.-M. (2010). *Emotions in multiple languages*. Basingstoke, Hampshire, UK: Palgrave Macmillan.

Dick, B. (2007). What can grounded theorists and action researchers learn from each other? In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 398-416). London: Sage.

Downie, A. (2010). Brazilian universities find challenges in internationalization, *Chronicle of Higher Education*. Retrieved from https://chronicle.com/article/Brazilian-Universities-Find/124312/

Draguns, J. G. (2001). Toward a truly international psychology: Beyond English only. *American Psychologist, November 2001*, 1019-1030.

Dul, J., & Hak, T. (2008). *Case study methodology in business research*. Oxford: Elsevier.

Durand, C. X. (2006). If it's not in English, it's not worth reading! *Current Issues in Language Planning, 7*(1), 44-60.

Edwards, J. (2013). Bilingualism and multilinguism: Some central concepts. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 33-59). Oxford: Wiley-Blackwell.

EF Australia. (2011). Country profile - Brazil. Retrieved from http://www.ef-australia.com.au/epi/archive/v2/south-america/brazil/

Ehrenreich, S. (2010). English as a business lingua franca in a German multinational corporation: Meeting the challenge. *Journal of Business Communication, 47*(4), 408-431. doi: 10:1177/0021943610377303

El-Dash, L. G., & Busnardo, J. (2001). Brazilian attitudes toward English: Dimensions of status and solidarity. *International Journal of Applied Linguistics, 11*(1), 57-74.

Ellis, C., & Bochner, A. P. (2003). Autoethnography, personal narrative, reflexivity: Researcher as subject. In N. K. Denzin & Y. S. Lincoln (Eds.), *Collecting and interpreting qualitative materials* (2nd ed., pp. 199-258). Thousand Oaks, CA: Sage.

Eriksen, T. (2007). *Globilization: The key concepts*. Oxford: Berg.

Erling, E. J., & Walton, A. (2007). English at work in Berlin: A report on a survey of seven multinational companies in Germany. *English Today 89, 23*(1), 33-40. doi: 10.1017/S026607840700106X

Fairclough, N. (2001). *Language and power* (2nd ed.). London: Longman.

Farbotko, C., & McGregor, H. V. (2010). Copenhagen, climate science and the emotional geographies of climate change. *Australian Geographer, 41*(2), 159-166. doi: 10.1080/00049181003742286

Fennig, C. D. (2013). Nailing jello to the wall: Language identification. Retrieved from http://www.ethnologue.com/ethnoblog/chuck-fennig/nailing-jello-wall-language-identification#.VKcq1dgcQkI

Fishman, J. A. (2013). Language maintenance, language shift, and reversing language shift. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 511-543). Oxford: Wiley-Blackwell.

Fontana, A., & Frey, J. (1994). Interviewing: the art of the science. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (pp. 361-376). London: Sage.

Fredriksson, R., Barner-Rasmussen, W., & Piekkari, R. (2006). The multinational corporation as a multilingual organization: The notion of a common corporate language. *Corporate Communications: An International Journal, 11*(4), 406-423.

Gad, U. P. (2009). Post-colonial identity in Greenland? When the empire dichotomizes back - bring politics back in. *Journal of Language and Politics, 8*(1), 136-158. doi: 10.1075/jlp.8.1.08gad

Gad, U. P. (2014). Greenland: A post-Danish sovereign nation state in the making. *Cooperation and Conflict, 49*(1), 98-118. doi: 10.1177/0010836713514151

Gagnon, A. J., Carnevale, F., Mehta, P., Rousseau, H., & Stewart, D. E. (2013). Developing population interventions with migrant women for maternal-child

health: a focused ethnography. *BMC Public Health, 13*. doi:10.1186/1471-2458-13-471

García Landa, L. G. (2006). Academic language barriers and language freedom. *Current Issues in Language Planning, 7*(1), 61-81.

Gärdenfors, P. (2007). Understanding cultural patterns. In M. Suárez-Orozco (Ed.), *Learning in the global era*. Berkeley CA: University of California Press.

Garrett, P. (2010). Meanings of 'globalization': East and West. In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 447-474). London: Wiley-Blackwell.

Gibbert, M., Ruigrok, W., & Wicki, B. (2008). What passes as a rigorous case study. *Strategic Management Journal, 29*, 1465-1474.

Gifford, R. (2007). *Environmental psychology: Principles and practice* (4th ed.). Colville, WA, USA: Optimal Books.

Ginsburgh, V., & Prieto, J. (2010). Returns to foreign languages of native workers in the EU. *Industrial and Labor Relations Review*.

Ginsburgh, V., & Weber, S. (2011). *How many languages do we need? The economics of linguistic diversity*. Princeton, NJ: Princeton University Press.

Glaser, B. G. (1992). *Emergence vs. forcing: Basics of grounded theory analysis*. Mill Valley, CA: The Sociology Press.

Glaser, B. G. (2007). Doing formal theory. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 97-113). London: Sage.

Glaser, B. G., & Strauss, A. (1967). *The discovery of grounded theory: Strategies for qualitative research*. Chicago: Aldine.

Gramley, S. (2012). *The history of English: An introduction*. London: Routledge.

Grbich, C. (1998). *Qualitative research in health: An introduction*. London: Sage.

Guba, E. (1981). Criteria for assessing the trustworthiness of naturalistic enquiries. *Educational Resources Informaiton Centre Annual Review*(29), 2.

Hamel, R. E. (2005). El español como lengua de las ciencias frente a la globalización del inglés (D. d. Antropología, Trans.) (pp. 1-60). Mexico City: Universidad Autónoma Metropolitana.

Hamel, R. E. (2007). The dominance of English in the international scientific periodical literature and the future of language use in science. *AILA Review, 20*, 53-71.

Hamel, R. E. (2010). Engaging a plurilingual scientific community. *Anthropology News, 51*(5), 17. doi: 10.1111/j.1556-3502.2010.51517.x

Hammersley, M., & Atkinson, P. (2005). *Ethnography: Principles in practice* (2nd ed.). London: Routledge.

Harth, N. S., Leach, C. W., & Kessler, T. (2013). Guilt, anger, and pride about in-group environmental behaviour: Different emotions predict distinct intentions. *Journal of Environmental Psychology, 34*, 18-26.

Harvey, M. G., & Griffith, D. A. (2002). Developing effective intercultural relationships: The importance of communication. *Thunderbird International Business Review, 44*(1), 455-476.

Higginson, T. W. (1948). *The Enchiridion by Epictetus* Retrieved from http://www.gutenberg.org/files/45109/45109-0.txt

Hipólito, J. (2011). The sensorial effect: Dynamics of emotion in pro-environmental behavior. *Applied Environmental Education & Communication, 10*(4), 189-200. doi: 10.1080/1533015X.2011.669680

Holly, M. L., Arhar, J. M., & Kasten, W. C. (2009). *Action research for teachers: Traveling the yellow brick road* (3rd ed.). Boston: Pearson Allyn & Bacon.

Holton, J. A. (2007). The coding process and its challenges. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 265-289). London: Sage.

IATA. (2012). Airlines to welcome 3.6 billion passengers in 2016 Retrieved from http://www.iata.org/pressroom/pr/pages/2012-12-06-01.aspx

ICSU IPY 2007-2008 Planning Group. (2004). A framework for the International Polar Year 2007-2008. In I. Krupnick (Ed.): International Council for Science. Retrieved from http://classic.ipy.org/development/framework/framework.pdf

IMBd. (2014). Harry Potter and the Philosopher's Stone release statistics. Retrieved from http://www.imdb.com/title/tt0241527/releaseinfo?ref_=tt_dt_dt

Internet World Stats. (2014a). Facebook. Retrieved from http://www.internetworldstats.com/facebook.htm

Internet World Stats. (2014b). Internet users in the world. Retrieved from http://www.internetworldstats.com/stats.htm

IPCC. (2013). Summary for policymakers In T. F. Stocker, D. Qin, G.-K. Plattner, M. Tignor, S. K. Allen, J. Boschung, A. Nauels, Y. Xia, B. V. & P. M. Midgley (Eds.), *Climate Change 2013: The physical science basis. Contribution of Working Group I to the fifth assessment report of the Intergovernmental Panel on Climate Change*. Cambridge: Cambridge University Press.

Irvine, F. E., Lloyd, D., Jones, P. R., Allsup, D. M., Kakehashi, B. C., Ogi, A., & Okuyama, M. (2007). Lost in translation? Undertaking transcultural qualitative research. *Nurse Researcher, 14*(3), 46-58.

Jacobsen, B. (2003). Colonial Danish. *International Journal of the Sociology of Language, 159*, 153-164.

James, E. (2005). *Gardens of Delight*. London: Orion Books.

James, J. J., & Bixler, R. D. (2008). Children's role in meaning making through their participation in an environmental education program. *The Journal of Environmental Education, 39*(4), 44-59.

Jandt, F. (2003). *An introduction to intercultural communication: Identities in a global community*. Thousand Oaks, California: Sage.

Janssens, M., Lambert, J., & Steyaert, C. (2004). Developing language strategies for international companies: The contribution of translation studies. *Journal of World Business, 39*, 414-430.

Jenkins, J. (2007). *English as a lingua franca: Attitude and identity*. Oxford: University Press.

Jenkins, J., Cogo, A., & Dewey, M. (2011). Review of developments in research into English as a lingua franca. *Language Teaching, 44*(3), 281-315.

Jones, J. S. (2010). Origins and ancestors: A brief history of ethnography. In J. S. Jones & S. Watt (Eds.), *Ethnography in social science practice*. London: Routledge.

Joseph, J. E. (2004). *Language and identity: National, ethnic, religious*. Basingstoke, Hampshire: Palgrave Macmillan.

Kachru, B. B. (1986). *The alchemy of English: The spread, functions and models of non-native English*. Oxford: Pergamon.

Kaiser, B., Zicus, S. A., & Allen, B. (Eds.). (2010). *Polar science and global climate: An international resource for education and outreach*. Harlow, Essex, UK: Pearson Education.

Kapborg, I., & Bertero, C. (2002). Using an interpreter in qualitative interviews: Does it threaten validity? *Nursing Inquiry, 9*(1), 52-56.

Karra, N., & Nelson, P. (2008). Researching 'back home': International management research as authethnography. *Organizational Research Methods, 11*, 541-561. doi: 10.1177/1094428106295496

Kaur, J. (2010). Achieving mutual understanding in world Englishes. *World Englishes, 29*, 192-208. doi: 10.1111/j.1467-971X.2010.01638.x

Laverack, G., & Brown, K. (2003). Qualitative research in a cross-cultural context: Fijian experiences. *Qualitative Health Research, 13*(3), 333-342.

Lerner, A. J. (1956). Why can't the English? On *My Fair Lady* [Broadway cast recording]. New York, NY: Columbia Records.

Lewis, M. P., Simons, G. F., & Fennig, C. D. (Eds.). (2013). *Ethnologue: Languages of the world* (17th ed.). Dallas, TX: SIL International.

Lincoln, Y. S., & Guba, E. (1986). But is it rigorous? Trustworthiness and authenticity in naturalistic evaluation. In D. Williams (Ed.), *New directions for program evaluation*. San Francisco: Jossey-Bass.

Lloyd, M. (2014). Interview with Paulo Speller, Brazilian higher education secretary, *Encino superior Unicamp*. Retrieved from http://www.revistaensinosuperior.gr.unicamp.br/entrevistas/interview-with-paulo-speller-brazilian-higher-education-secretary

Lombardi, D., & Sinatra, G. M. (2013). Emotions about teaching about human-induced climate change. *International Journal of Science Educational Research, 35*(1), 167-191.

Louv, R. (2008). *Last child in the woods: Saving our children from nature-deficity disorder*. Chapel Hill, NC: Algonquin Books.

Luscombe, S. (2013). Timelines: The British Empire. Retrieved 28 November 2013, from http://www.britishempire.co.uk/timeline/timeline.htm

MacIntyre, P. D., Clément, R., Dörnyei, Z., & Noels, K. A. (1998). Conceptualizing willingness to communicate in a second language: A situational model of second language confidence and affiliation. *The Modern Language Journal, 82*(4), 545-562.

Mäkelä, K., Kalla, H., & Piekkari, R. (2006). Interpersonal knowledge sharing within multinationals: Homophily as a driver for clustering. In K. Mäkelä (Ed.), *Essays on interpersonal level knowledge sharing within the multinational corporation*. Helsinki: Helsinki School of Economics A-277.

Malinowski, B. (1922). *Argonauts of the western Pacific: An account of native enterprise in the archipelagoes of Melanesian New Guinea*. London: G. Routledge & Sons.

Marcus, A. P. (2011). Rethinking Brazil's place within Latin Americanist geography. *Journal of Latin American Geography, 10*(1), 131-149.

Martinovic, I., & Altarriba, J. (2013). Bilingualism and emotion: Implications for mental health. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 292-320). Oxford: Wiley-Blackwell.

Mason, J. (2002). *Qualitative researching* (2nd ed.). London: Sage.

Matear, A. (2008). English language learning and education policy in Chile: Can English really open doors for all? *Asia Pacific Journal of Education, 28*(2), 131-147. doi: 10.1080/02188790802036679

McDonald's. (2014). About McDonald's. Retrieved from http://www.aboutmcdonalds.com/mcd/our_company.html

McGloin, S. (2008). The trustworthiness of case study methodology. *Nurse Researcher, 16*(1), 45-55.

Mead, M. (1943). *Coming of age in Samoa: A study of adolescence and sex in primitive societies*. Hammondswort: Penguin.

Meierkord, C. (2012). *Interactions across Englishes: Linguistic choices in local and international contact situations*. Cambridge: Cambridge University Press.

Melitz, J. (2007). The impact of English domance on literature and welfare. *Journal of Economic Behavior and Organization, 64*, 193-215.

Millar, M. G., & Millar, K. U. (1996). The effects of direct and indirect experience on affective and cognitive responses and the attitude-behavior relation. *Journal of Experimental Social Psychology, 32*, 561-579.

Mills, G. E. (2007). *Action research: A guide for the teacher researcher* (3rd ed.). Upper Saddle River, NJ: Pearson Merrill Prentice Hall.

Ministerio de Educación de Chile. (2012). Idioma extranjero inglés – propuesta curricular: Fundamentos y objetivos, educación básica. Retrieved from http://www.mineduc.cl/index5_int.php?id_portal=47&id_contenido=17116&id_seccion=3264&c=6882

Morse, J. M. (2007). Sampling in grounded theory. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 229-244). London: Sage.

Mufwene, S. S. (2010). Globalization, global English, and world English(es): Myths and facts. In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 31-55). Chichester, UK: Wiley-Blackwell.

Munoz, V. (2010). *Ideologies regarding the implementation of foreign language policy in Chile: A case study.* (Master of Science), University of Edinburgh. Retrieved from http://hdl.handle.net/1842/5322

Murphy, E., & Dingwall, R. (2003). *Qualitative methods and health policy research*. New York: Aldine de Gruyter.

National Association for the Education of Young Children. (2009). Where we stand on responding to linguistic and cultural diversity Retrieved from http://www.naeyc.org/files/naeyc/file/positions/diversity.pdf

Newbury, J. (2011). Situational analysis: Centerless systems and human service practices. *Child & Youth Services, 32*(2), 88-107.

Newell, B., & Pitman, A. (2010). The psychology of global warming: Improving the fit between the science and the message. *Bulletin of the American Meteorological Society, 91*, 1003-1014.

O'Byrne, P. (2007). The advantages and disadvantages of mixing methods: An analysis of combining traditional and autoethnographic approaches. *Qualitative Health Research, 17*(10), 1381-1391.

O'Dowd, R. (2003). Understanding the "other side": Intercultural learning in a Spanish-English e-mail exchange. *Language Learning & Technology, 7*(2), 118-144.

Office of American Spaces. (2014). About American Spaces. Retrieved from https://americanspaces.state.gov/drupal6/about

One Europe. (2013). Translation in the European Union - Facts and figures. Retrieved from http://one-europe.info/translation-in-the-european-union-facts-and-figures

Opoku-Amankwa, K. (2009). English-only language-in-education policy in multilingual classrooms in Ghana. *Language, Culture and Curriculum, 22*(2), 121-135.

Pahl, K. (2012). Seeing with a different eye. In M. Grenfell, D. Bloome, C. Hardy, K. Pahl, J. Rowsell & B. Street (Eds.), *Language, ethnography and education: Bridging new literacy studies and Bourdieu* (pp. 87-109). New York: Routledge.

Park, J. S.-Y., & Wee, L. (2011). A practice-based critique of English as a lingua franca. *World Englishes, 30*(3), 360-374.

Pavlenko, A. (2006). Bilingual selves. In A. Pavlenko (Ed.), *Bilingual minds: Emotional experience, expression and representation* (pp. 1-33). Clevedon, UK: Multilingual Matters.

Pavlenko, A. (2008). Emotion and emotion-laden words in the bilingual lexicon. *Bilingualism: Language and Cognition, 11*(2), 147-164.

PEI. (2013a). About PEI. Retrieved from http://polareducator.org/about

PEI. (2013b). Polar Educators International Strategic Plan. Retrieved from http://polareducator.org/images/documents/PEIStrategicPlan_2013.pdf

Penn, C., & Evans, M. (2009). Recommendations for communication to enhance informed consent and enrolment at multilingual research sites. *African Journal of AIDS Research, 8*(3), 285-294.

Pennycook, A. (1994). *The cultural politics of English as an international language*. London: Longman.

Pennycook, A. (2010). Popular cultures, popular languages, and global identities. In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 592-607). Oxford: Wiley-Blackwell.

Perrin, J. L. (2011). Emotional responses to environmental messages and future behavioral intentions. *Applied Environmental Education & Communication, 10*, 146-157.

Phillipson, R. (2001). English for globalisation or for the world's people? *International Review of Education - Internationale Zeitschrift fur Erziehungswissenschaft - Revue Internationale de l'Education, 47*(3-4), 185-200.

Phillipson, R. (2011). English: from British empire to corporate empire. *Sociolinguistic Studies, 5*(3), 441-464.

Phillipson, R., & Skutnabb-Kangas, T. (2013). Linguistic imperialsim and endangered languages. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilinguism* (2nd ed., pp. 544-570). Oxford: Wiley-Blackwell.

Planken, B. (2005). Managing rapport in lingua franca sales negotiations: A comparison of professional and aspiring negotiators. *English for Specific Purposes, 24*, 381-400.

Political Geography Now. (2014). Countries of the world. Retrieved from http://www.polgeonow.com/2011/04/how-many-countries-are-there-in-world.html

Pooley, J. A., & O'Connor, M. (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment and Behavior, 32*(5), 711-723.

Provencher, J., Baeseman, J., Carlson, D. J., Bahde, R., Bellman, J., Hik, D., . . . Zicus, S. A. (2011). Polar research education, outreach and communication during the fourth IPY: How the 2007-2008 International Polar Year has contributed to the future of education, outreach and communication. Paris: ICSU.

Pullin, P. (2010). Small talk, rapport and international communicative competence: Lessons to learn from BELF. *Journal of Business Communication, 47*(4), 455-476.

Rajagopalan, K. (2003). The ambivalent role of English in Brazilian politics. *World Englishes, 22*(2), 91-101.

Rapoport, R. (1970). Three dilemmas in action research. *Human Relations, 23*(499).

Ricento, T. (2010). Language policy and globalization. In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 123-141). London: Wiley-Blackwell.

Ridge, B. (2004). Bangsa Malaysia and recent Malaysian English language policies. *Current Issues in Language Planning, 5*(4), 407-423. doi: 10.1080/14664200408668266

Roberts, C., Moss, B., Wass, V., Sarangi, S., & Jones, R. (2005). Misunderstandings: A qualitative study of primary care consultations in multilingual settings, and educational implications. *Medical Education, 39*, 465-475.

Roeser, S. (2012). Risk communication, public engagement, and climate change: A role for emotions. *Risk Analysis, 32*(6), 1033-1040.

Romaine, S. (2013). The bilingual and multilingual community. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 487-511). Oxford: Wiley-Blackwell.

Rowsell, J. (2012). Artifactual English. In M. Grenfell, D. Bloome, C. Hardy, K. Pahl, J. Rowsell & B. Street (Eds.), *Language, ethnography and education: Bridging new literacy studies and Bourdieu* (pp. 110-131). New York: Routledge.

Salmon, R., Carlson, D. J., Zicus, S. A., Pauls, M., Baeseman, J., Sparrow, E. B., . . . Raymond, M. (2011). Education, outreach and communication during the International Polar Year 2007-2008: Stimulating a global polar community. *The Polar Journal, 1*(2), 265-285.

Schmieding, N., & Kokuyama, T. (1995). The need for and process of collaborative international research: A replication study of Japanese staff nurse perceptions of head nurses' actions. *Journal of Advanced Nursing, 21*(5), 820-826.

Schmuck, R. A. (1997). *Practical action research for change*. Arlington Heights, IL: IRI/Skylight.

Seargeant, P. (2008). Language, ideology and ‘English within a globalized context’. *World Englishes, 27*, 217-232. doi: doi: 10.1111/j.1467-971X.2008.00553.x

Searles, K. (2010). Feeling good and doing good for the environment: The use of emotional appeals in pro-environmental public service announcements. *Applied Environmental Education & Communication, 9*(3), 173-184. doi: 10.1080/1533015X.2010.510025

Seidlhofer, B. (2005). English as a lingua franca. *ELT Journal, 59*, 339-341.

Seidlhofer, B. (2009). Common ground and different realities: World Englishes and English as a lingua franca. *World Englishes, 28*(2), 236-245.

Silva, R. S. (2000). Pragmatics, bilingualism, and the native speaker. *Language and Communication, 20*(2), 161-178.

Skutnabb-Kangas, T., & Phillipson, R. (2010). The global politics of language: Markets, maintenance, marginalization, or murder? In N. Coupland (Ed.), *The handbook of language and globalization* (pp. 77-100). London: Wiley-Blackwell.

Smith, L. E., & Nelson, C. L. (2006). World English and issues of intelligibility. In B. B. Kachru, Y. Kachru & C. L. Nelson (Eds.), *The handbook of world Englishes* (pp. 428-445). Oxford: Blackwell.

Spellerberg, S. M. (2011). English acquisition in Denmark and Greenland: Gender-related tendencies. *International Journal of Multilingualism, 8*(3), 155-188. doi: 10.1080/14790718.2011.578747

Spring, J. (2008). *Globalization of education: An introduction (electronic resource)*. New York, NY: Routledge.

Squires, A. (2009). Methodological challenges in cross-languages qualitative research: A research review. *International Journal of Nursing Studies, 46*, 277-287. doi: 10.1016/j.ijnurstu.2008.08.006

Stake, R. E. (2006). *Multiple case study analysis*. New York: Guilford Press.

Suárez-Orozco, M., & Sattin, C. (2007). Introduction. In M. Suárez-Orozco (Ed.), *Learning in the global era*. Berkeley, CA: University of California Press.

Sue, D. W., & Sue, D. (2003). *Counseling the culturally diverse: Theory and practice* (4th ed.). New York: John Wiley & Sons.

Sweeny, E., & Hua, Z. (2010). Accomodating toward your audience. *Journal of Business Communication, 47*(4), 477-504. doi: 10117700219436107730 8

Tange, H. (2009). Language workers and the practice of language management. *Corporate Communications: An International Journal, 14*(2), 131-143.

Tange, H., & Lauring, J. (2009). Language management and social interaction within the multilingual workplace. *Journal of Communication Management, 13*(3), 218-232. doi: 10.1108/13632540910976671

Teram, E., Schacter, C., & Stalker, C. (2005). The case for integrating grounded theory and participatory action research: Empowering clients to inform professional practice. *Qualitative Health Research, 15*(8), 1129-1140. doi: 10.1177/1049732305275882

Timmermans, S., & Tavory, I. (2007). Advancing ethnographic research through grounded practice. In A. Bryant & K. Charmaz (Eds.), *The SAGE handbook of grounded theory* (pp. 493-512). London: Sage.

TOEFL. (2014). Brazil's English Without Borders programme to use TOEFL tests. Retrieved from http://www.theguardian.com/higher-education-ets-toefl-partner-zone/brazil-english-without-borders-toefl

UNESCO. (2003). UNESCO position paper: Education in a multilingual world. Paris, France: UNESCO.

UNESCO. (2009). Investing in cultural diversity and intercultural dialogue. Paris, France: UNESCO.

UNESCO. (2011). A new cultural policy agenda for development and mutual understanding. Paris, France: UNESCO.

United Nations Task Team on Social Dimensions of Climate Change. (2013). *The social dimensions of climate change: Discussion draft.* Retrieved from http://www.who.int/globalchange/mediacentre/events/2011/social-dimensions-of-climate-change.pdf

Vaara, E., Tienari, J., Piekkari, R., & Santti, R. (2005). Language and the circuits of power in a multinational corporation. *Journal of Management Studies, 42*(3), 595-623.

Walter, H. (1996). *L'évolution des langues de la communication scientifique: Le français et les langue sientifiques de demain*. Paper presented at the Congrès de l'Association francophone pour le savoir (AC-FAS), Montreal. Retrieved from http://www.acfas.ca/evenements/conf_inaugurale.html

Wei, L. (2013). Conceptual and methodological issues in bilingualism and multilinguism research. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 60-88). Oxford: Wiley-Blackwell.

Welch, C., & Piekkari, R. (2006). Crossing language boundaries: Qualitative interviewing in international business. *Management International Review, 46*(4), 417-437.

Welch, D., Welch, L., & Piekkari, R. (2005). Speaking in tongues: The importance of language in international management processes. *International Studies of Management & Organization, 35*(1), 10-27.

Wright, W. E. (2013). Bilingual education. In T. K. Bhatia & W. C. Ritchie (Eds.), *The handbook of bilingualism and multilingualism* (2nd ed., pp. 651-678). Oxford: Wiley-Blackwell.

Wyatt, N., & Stolper, D. (2013). Science literacy in Australia. Retrieved from https://www.science.org.au/sites/default/files/user-content/scienceliteracyreport.pdf

Wyatt, T. R. (2012). Atuarfitsialak: Greenland's cultural compatible reform. *International Journal of Qualitative Studies in Education, 25*(6), 819-836. doi: 10.1080/09518398.2011.558033

Yeganeh, M. T. (2013). Age constraint on foreign language learning in monolingual versus bilingual learners. *Procedia: Social and Behavioral Sciences 30*, 1794-1799.

Yin, R. K. (1994). *Case study research: Design and methods* (2nd ed.). Beverly Hills, CA: Sage.

Yin, R. K. (2003). *Case study research: Design and methods*. Thousand Oaks, CA: Sag.

Young, D. (1992). Effective instruction for all students. *Kamehameha Journal of Education, 3*(2), 39-52.

Zarrinabadi, Z. (2014). Communicating in a second language: Investigating the effect of teacher on learners' willingness to communicate. *System, 42*(1), 288-295.

Zarrinabadi, Z., Ketabi, S., & Abdi, R. (2014). Facilitating willingness to communicate in the second language classroom and beyond. *The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 87*(5), 213-217. doi: 10.1080/00098655.2014.924895

Zicus, S. A. (2003). *Youth action in the marine environment: A case study analysis of selected education projects in Hawai'i, USA.* (PhD), University of Hawai'i, Manoa, HI.

Zicus, S. A., Almeida, M., Edwards, K., Hik, D., Huffman, L., Kaiser, B., . . . Xavier, J. (2011). IPY education activities In I. Krupnick, I. Allison, R. Bell, P. Cutler, D.

Hik, J. López-Martinez, V. Rachold, E. Sarukhanian & C. Summerhayes (Eds.), *Understanding Earth's polar challenges: International Polar Year 2007-2008* (pp. 481-496). Rovaniemi, Finland: University of the Arctic/CCI Press.

Appendix 1: Formal Research Respondents (Both Stages)

Interview Respondents		
Country of birth	**Native language(s)**	**Profession**
Argentina	Spanish	Antarctic marine biologist
Argentina	Spanish	Antarctic biologist
Argentina	Spanish	Polar organisation media officer
Argentina	Spanish	Antarctic geologist
Argentina	Spanish	Antarctic policy researcher
Argentina	Spanish	Secondary school teacher
Argentina	Spanish	Antarctic policy researcher
Argentina	Spanish	Antarctic biologist
Argentina	Spanish	Antarctic biologist
Argentina	Spanish	Meteorologist
Argentina	Spanish	Oceanographer
Argentina	Spanish	Sea ice researcher
Argentina	Spanish	Glaciologist
Argentina	Spanish	Antarctic policy researcher
Belgium	Dutch	Science educator/scientist
Brazil	Portuguese	English teacher
Canada	English	Social scientist
Chile	Spanish	Director university research institute
Chile	Spanish	Archaeologist
Chile	Spanish	Archaeologist
Chile	Spanish	Education director
Chile	Spanish	English teacher
Chile	Spanish	Ministry of Education program director
Chile	Spanish	Environmental educator
Denmark	Danish	Teacher, school science advisor
Denmark	Danish	Primary school science teacher
Denmark	Danish	Middle school English teacher
Denmark	Danish	Primary school teacher
Denmark	Danish	Primary school teacher
France	French	Science communicator
France	French	Polar biologist
Germany	German	Media officer for polar research organisation
Greenland	Greenlandic	Primary school science teacher
Greenland	Danish	Primary school English teacher
Iceland	Icelandic	Secondary school headmaster
Iceland	Icelandic	Primary school headmaster

Iceland	Icelandic, English	Primary school teacher
Indonesia	Indonesian	University water management researcher
Italy	Italian	Museum educator
Malaysia	Malay	President youth environmental organisation
Malaysia	Malay	Youth environmental program coordinator
Malaysia	Malay	Member youth environmental board of directors
Malaysia	Malay	Youth environmental group executive director
Malaysia	Malay	University forester
Malaysia	Malay	University waste management researcher
Mexico	Spanish	Bilingual teacher
Netherlands	Dutch	Education consultant
Norway	Norwegian	University president
Philippines	Tagalog	Scientist, environmental educator
Portugal	Portuguese	Antarctic marine biologist
South Africa	English	Antarctic program coordinator
UK	English	Education director
UK	English	College English teacher
USA	English	Polar organisation director
USA	English	Polar research education officer
USA	English	Polar research program director
Focus groups *(numbers of individuals in brackets)*		
University student volunteers *(12)*		Malaysia
Environmental group high school students *(6)*		Malaysia
Pre-service English teachers *(8)*		Chile, Canada *(1)*
Written surveys		
Polar researchers conference participants *(23)*		Brazil, Chile, Argentina, Uruguay, UK *(1)*
Environmental camp participants (teachers, university students and government employees) *(52)*		Malaysia
Pre-service English teachers *(8)*		Chile, Canada *(1)*

Appendix 2: Provisional Start Codes for Data Analysis

1. Use of English as international language
    a. positives
    b. negatives
        i. loss of richness
        ii. loss of precision
        iii. unequal power relations
        iv. perception of professionalism and quality of work
        v. limitation of opportunities
2. Role of culture
3. Impacts on emotion
4. Impacts of 'English only' in science/environmental research and publication
5. Learning English as a second/foreign language
    a. facilitating factors
        i. motivation
        ii. education systems
        iii. national or regional policies
        iv. mass media
    b. barriers or impediments
        i. economics
        ii. education systems
        iii. national or regional policies
        iv. mass media
6. Strategies to improve understanding across linguistic boundaries
    a. relationship building
        i. awareness and respect
        ii. focus on similarities
        iii. language use
    b. negotiating meaning
        i. personal strategies
        ii. computer technologies
            1. potential
            2. limitations
        iii. translation/multilingual programs and materials
            1. possibilities
            2. problems and limitations
                a. maintaining conceptual equivalence
                b. maintaining currency (new knowledge)
                c. costs (time and money)

Appendix 3: IPY Starting Interview Questions

Preliminary information provided to respondents before interview

In this study, I am exploring the experiences of individuals from a broad range of countries who were involved in international education, outreach and communication initiatives about polar issues during the recent IPY. This is an in-depth investigation of how the IPY education and outreach programs functioned in relation to multilingual issues, with the aim of identifying potential commonalities and differences about what worked well in different cultural, linguistic and social contexts. Analysis of the data obtained will be used to refine research questions that will be investigated in more depth in the next stage.

The purpose of the second stage will be to broaden the focus from a single program and topic (IPY polar research), and consider if and how the findings of the first stage might benefit other global environmental education and outreach programs or projects.

Interview questions will centre on two aspects of the IPY EOC program – your interactions related to language and culture during committee and working group meetings, and your perceptions of the reasons for success (or lack of success) in international education and outreach programs that were conducted over a two-year period. I will also ask for your opinions on the positives and negatives of using English as the main international language to communicate on issues such as climate change, and for suggestions about effective ways to communicate about these issues across cultural and linguistic boundaries.

Starting questions

Background:

- What was your role in IPY?
- How did you get involved in IPY EOC?
- Do you consider yourself primarily an educator, science communicator, science researcher or something else? (If so, what?)
- What is/are your native language(s)?
- Do you speak/understand/read/write any other languages? To what level of fluency (self-perception)?
- When and how did you learn English? What was your motivation? In other words, why did you learn it?
- (For those who speak more than 2 languages) When you are interacting with another person whose native language you speak fairly fluently (but who also shares your level of fluency in English), what language would you generally use? Why?

Committee and working group meetings:

- Did the fact that the meetings were in English affect your participation? How and why?
- Did the general use of English at IPY meeting social events affect your participation? If so, how and why?
- Did the native English speakers dominate the discussions or have greater influence in setting the directions of the meetings and activities? If so, why (in your opinion) and in what way?

English educational materials:

- Did the lack of materials in their native language(s) limit people's participation in the international IPY educational activities in your country?
- How important was it to have materials translated?
- Did children in your country participate in projects with children from other countries that spoke different languages? If so, can you give me specific examples?
    - Did these interactions occur mostly in formal education (i.e., school) or informal (e.g., science centres, clubs, etc.) settings?
    - How did the participants and facilitators deal with the language differences?
    - Do you think this cross-cultural communication changed the perspectives of the children towards people from other countries/cultures? In what ways?
    - Did it change their (the children's) understanding of the underlying issues (e.g., climate change, polar research)?
- What are your general perspectives regarding the use of English to communicate internationally on environmental issues such as climate change?
    - Positives?
    - Negatives?
- What general suggestions do you have for the best ways to communicate across cultural and linguistic boundaries?
- Do you know of any emerging or continuing polar-related EOC projects in your country that are involving young people (children, teenagers, university students) in international collaboration with people who speak a different language (or a variety of languages)? Examples?

Appendix 4: Sharing our Planet Project Focus Questions

Name of school: Location: Latitude & longitude:

1. GETTING TO KNOW EACH OTHER

Describe your local environment or ecosystem. Add pictures if you can.

Weather and Climate

A. How warm does it get where you live? How cold?
B. Describe the seasons where you live.
C. What kinds of 'extreme weather' occur where you live?

Natural Resources

A. What plants and animals are found in your region?
B. Which ones are important to you? In other words, which ones do you use for food, building materials, medicines, or other purposes?
C. What other valuable natural resources are there in your country? (e.g., minerals, fossil fuels, etc.)

Human life

A. Where does your drinking water come from?
B. Where does your electricity come from?
C. What do you do with your rubbish (trash)? Where does it end up?

2: INVESTIGATING A LOCAL PROBLEM

Pollution

A. What is pollution?
B. What kinds of pollution do you have in your town or region?
C. Why is pollution a problem?
D. What can YOU do about it?

3. MAKING GLOBAL CONNECTIONS

Climate Change

A. What is the greenhouse effect?
B. What is global climate change?
C. What things are causing climate change now?
D. How is the changing climate affecting your region or country?
E. What can YOU do about it?

4. SHARING YOUR KNOWLEDGE

These are just a few possibilities. You may have other ideas. Be creative!

A. Environmental project show-and-tell: What have you been doing at your school or in your community?
B. Create a joint environmental story, poem, or song with the other schools in the project. It can be in more than one language.
C. Participate in a Skype call or web conference with other project schools.